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E.D.A. Activities.

LAST week the British Electrical Development Association held its annual meeting—a private function—and its annual dinner, at which a well-earned tribute was paid to its activities and to the colossal effort which it has put forth during the twelve months in collaboration with E.L.M.A.

There are numerous thriving societies and institutions in connection with the electrical industries, each of which more or less adequately serves the interests of its members; but, with the exception of the E.T.B.I., there is none other than E.D.A. whose objects are so largely altruistic, so advantageous to the public at large—and none which so efficiently fulfils the purposes for which it was created. In any reference made to the work of the E.D.A. during the year 1926, full recognition must be given to the fact that its widespread activity has been largely responsible for the marked rate of progress in the use of electricity for domestic service. The cumulative effect of its seven years of activity would alone have produced notable advance if there had been no intensive campaign during the past six months and no help from a seven months' coal shortage. To take a single instance of the far-reaching influence of its work, we may quote the fact that at the Electric House arranged by the Association at the Ideal Home Exhibition of a year ago 150,000 visitors passed through the building, and the large number of 12,000 inquiries resulted. This, followed by the electric-house and other campaign operations which have been proceeding in most parts of the country, has been bearing fruit over very large areas, and some of this fruit has fallen to those who have not deserved it; by this we mean that concerns which have never given the smallest financial support to the organisation have been receiving a reward that they have not earned. We mention this circumstance in the hope that it may quicken some consciences.

At the annual dinner of the Association which followed the meeting, Dr. S. Z. de Ferranti warmly commended the plan of "co-operative advertising" so

effectively put into practice by E.D.A., and Mr. C. A. McCurdy, K.C., president of the Advertising Association, expressed his enthusiastic admiration of the great campaign which is now drawing to a close, describing it as the most efficient and the most ably organised scheme of propaganda that he had ever seen.

At a later stage, Sir Andrew Duncan, chairman of the Central Electricity Board, who made an excellent impression by his declaration that the policy of the Board would be essentially one of friendly and helpful co-operation with all branches of the electricity supply industry and in no sense autocratic or domineering, expressed his appreciation of the admirable work already accomplished by E.D.A., and his conviction that the Association would be a most powerful ally of the Board in carrying out the work for which the latter was constituted. As we have pointed out on previous occasions, the Government scheme does nothing to promote the consumption of electricity, except by freeing the hands of the municipal authorities; that most important and indispensable complement to the work of the Board is left to be provided by the electricity supply industry itself, and it is indeed fortunate that a fully organised and ably directed machine in the form of the Electrical Development Association is in existence which, if adequately supplied with funds, may be relied upon to fill the need.

Such an occasion as the annual dinner, when the work of a particularly heavy year is in mind, affords a fitting opportunity for paying a tribute to the hard-working and painstaking way in which the experienced and tactful Director of the Association, Mr. J. W. Beauchamp, has carried out the duties of his increasingly important office. He has carried on under the heavy burden of recent days without losing his accustomed equanimity or becoming overwrought—which could hardly have been possible had he not confidence in the ability of the Business Manager, Mr. V. W. Dale, the spirit and energy of an experienced staff, and the campaign support of Mr. W. E. Bush. The industry owes much to Mr. Beauchamp for the organisation and direction of E.D.A. during the past seven years, and we make bold to suggest that on the next public occasion of the kind "a few words" from him would be in the nature of a "star turn."

The B.E.A.M.A. Meeting.

An ample summary of the operations of the Council of the B.E.A.M.A. during the past year will be found on later pages of this issue, together with a fairly full abstract of the speech in which the Chairman (Lieut.-Col. R. K. Morcom, C.B.E.) reviewed the course of the electrical industry and the various factors affecting it at home and abroad. In recent years we have come to regard the annual remarks of the B.E.A.M.A. chairmen as authoritative and sound, and we commend the present review to the careful consideration of all our readers. It is important that we should keep ourselves well informed periodically regarding the state of affairs in the various markets of the world, as well as the changing features of the international situation in respect of industrial competition. The turnover for the industry in 1926, though a record, was really a record "by way of an over-flow of pent-up waters." The position of the industrial motor section—a serious decline in orders is reported—is a matter for profound regret, and it is greatly to be hoped that we shall shortly witness a sustained revival of those other industries which at present are insufficiently electrified. Happily, in spite of all obstacles, we have been able to maintain our position as leading supplier of electrical goods abroad; indeed, with exports totalling £18,194,000 in 1926, the electrical industry "takes first place among the engineering export industries of the country." But the financial co-operation of America and Germany is operating greatly in favour of the industrial position of the latter now that she can borrow at 4 to 5 per cent. instead of 10 per cent. interest. The Dawes plan has intensified the competition that we are experiencing from Germany, and "it has served to bring France, Germany, and the United States into closer co-operation with a view to dominating the world markets." After covering these and various other features of the situation as it is officially viewed to-day, the chairman closed by urging the increased need for associated effort in our electrical and allied industries.

State Electricity in the Irish Free State.

The "Electricity (Supply) Bill, 1927," which passed its second reading in the Dail Eireann last week without a division, is a remarkable document. Whilst it resembles in some respects, and is obviously inspired by, our Act of 1926, it goes far beyond that measure in scope and tenor; this arises partly from the fact that it is to take the place of all existing legislation on electrical matters in the Free State, which is wholly repealed (with the sole exception of the Shannon Electricity Act, 1925), but still more from the unprecedented character of the system which it outlines.

The new "Electricity Supply Board" which is to be constituted, on the lines of the Central Electricity Board, is to be entrusted not only with powers and duties such as are exercised by that Board, but also with those of the Electricity Commission, and those of an authorised undertaker empowered to buy, sell, or manufacture anything electrical in any part of the Free State; it is to be armed with compulsory powers to control the supply and sale of electricity, to acquire electrical undertakings, to vary areas of supply, to purchase land, to secure wayleaves, to fix tariffs, and to close generating stations. Arbitration is provided for in some instances, and the Board's regulations for electricity supply, curious to say, must be approved by Dail Eireann; but its powers are extraordinarily wide, and the only control to which it is subject appears to be the right of the Executive Council of the Dail to dismiss any or all of the members of the Board. Speaking in the Dail, Mr. McGilligan emphasised the independence of the Board and its freedom from interference by his Department: once it was set up, he said, he would personally have no interest or responsibility for it. He had given the Board full powers to assume the position of being sole supplier, and the sooner it did that, the better!

We believe in the firm hand and the settled policy, in any class of business; but we have no faith at all in the conduct of trading undertakings by the State, or in the nationalisation of electricity supply, which is here contemplated, and the abolition of private enterprise. The provisions of the Bill savour of confiscation, from which even the municipalities will not be exempt; such a measure could never pass the second reading in a British Parliament.

The Retail Electrical Trade.

Accompanying the present number of the Electrical Review we are circulating to every reader a copy of our second supplement, the *Electrical Retailer and Dealer*. We repeat our request to readers to make the existence of this publication known to their smaller trade acquaintances who are transacting sales direct with the general public. We are anxious to bring it to the notice of every electrical trader, whether he is an electrical contractor, a hardwareman or an ironmonger, an electrical staff employé in a store, or an assistant in the showroom of an electrical contractor or an electricity supply department. If we can ensure that there is a spirit of enterprise being stimulated amongst all men and women in these classes by the reading of appropriate specialised literature which will keep them informed of movements and products, we shall be able to feel that we are doing something to raise the standard of efficiency in a section of the trade which so far has not been conspicuous for its strength, and may, perhaps, in actual fact have been neglected or even received the cold shoulder.

A Small Hydro-Electric Scheme.

The utilisation of a 3-ft. fall for supplying, in conjunction with a storage battery, a comparatively large rural area.

IT would be difficult to estimate the power which is running to waste over the low-head waterfalls on the small streams and rivers in this country. Many of these falls are situated out of the reach of the public supply systems, and it must be worth the while of the surrounding inhabitants to consider the utilisation of the available power for the generation of electricity to fulfil their needs for lighting, heating and power. The problem of utilising the power is, of course, much more difficult when the fall is very low, and perhaps this accounts for more of the streams not having been harnessed than is the case. That the problem can be solved successfully is evidenced by a scheme which has been completed at Avington, on the river Itchen, for the supply of electricity to the seat of Sir John Shelley Rolls, Bart., on whose estate the installation has been put down, and to the surrounding villages of Avington, Easton, and Itchen Abbas, although the available head of water is only three feet, fig. 1.

Fig. 1.—Power Station and Tail Race.

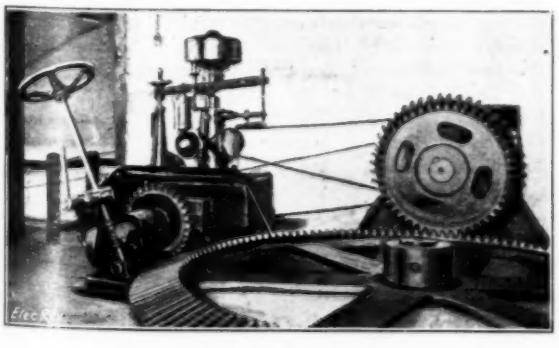


Fig. 2.—Driving Gear and Governor.

For this scheme an old dam, put down some 45 years ago in connection with a water-wheel which was used for grinding corn, has been recommissioned. A 23-h.p. Turgo vertical-shaft turbine, 45 in., 54 r.p.m., made by Messrs. Gilbert Gilkes & Co., Ltd., has been installed, and uses some 5,200 cu. ft. of water per min. Its speed is kept constant during varying loads and differences in head level by means of a Gilkes oil-pressure governor, fig. 2. The turbine belt drives, through spur gearing, a 13-kW Laurence, Scott & Co. dynamo at 550 r.p.m. This machine generates at 220 V; it is over-compounded, but arrangements are made for the short-circuiting of the series field during battery-charging operations.

The turbine plant is used in connection with a 120-cell battery, installed by Messrs. Pritchett & Gold and E.P.S. Co., Ltd., which is capable of a 30-A discharge for 5 hours. By running the turbine plant continuously and charging the battery during light-load periods, a supply can be given on peak loads considerably above the output of the running plant; a most important feature in connection with such small water installations.

A marble switchboard, fig. 3, constructed by Messrs. A. W. Sclater and Son, who were the engineers responsible for the whole scheme, accommodates the necessary measuring instruments and switchgear, including a system of change-over switches by means of which the supply at any time can be given by either the generator, fig. 3, or the battery, or both. A battery charging booster, also of Messrs. Laurence, Scott & Co.'s manufacture, forms part of the installation. It is a separately excited belt-driven machine, with an output of 40 A, 100 V.

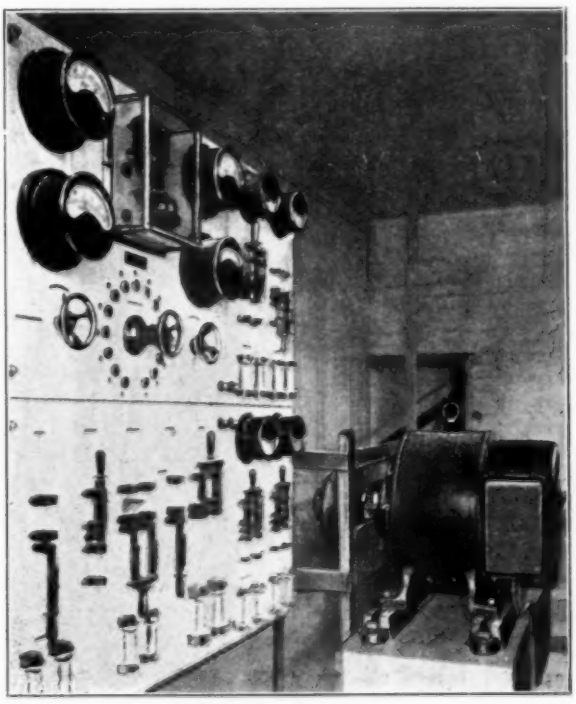


Fig. 3.—Switchboard and Generator.

It is of interest to note that since the plant was installed, the output has been considerably

increased by slightly raising the head at the banks and clearing the tail race where the water has to pass through the small-span arches of a public bridge.

Transmission to Sir John's residence, Avington House, and the villages is effected by means of Henley underground cables, about 4½ miles of which have been used. Besides supplying about 2,000 lamps, the plant provides for heating and cooking in Avington House and a number of the houses in the villages. Power for water pumping and a cold-storage plant is obtained from the installation, which also serves two dairy farms on which electricity is used for power. The consumers include three public houses, three churches, three village halls, and two post offices. A number of cottages are supplied under a free-wiring scheme at 10d. per kWh.

Nearly all the wiring in the villages is carried out with the Henley wiring system, and Avington House is wired with Henley 2,500-megohm wire, drawn into screwed tubing.

Another small hydro-electric installation put down by Messrs. Sclater & Son, for Capt. the Hon. T. H. Watson, Milverton, Somerset, has some interesting features. Here a 12-ft. head of water in a very small stream gives continuously an output of about 12 h.p. The turbine in this case is entirely ungoverned, being so designed as to withstand its own runaway speed, which is about 80 per cent. above that of full load. The line pressure is, however, maintained constant by means of an Isenthal solenoid voltage-regulating device, resulting in a considerable saving in the initial outlay.

Automatic Telephony in Sheffield.

The recent inauguration of automatic switching in the Sheffield telephone area constituted a world record from the point of view of the number of exchanges transferred simultaneously: new "Siemens" equipment has replaced eleven old manually-operated exchanges.

THE latest instance of progress in the provision of automatic telephony in this country is of outstanding importance, for the change-over of the Sheffield area probably constituted a world record so far as the number of exchanges involved in one transfer is concerned, and is certainly the largest in this respect yet undertaken by the British Post Office authorities.

On March 5th nine new automatic exchanges were opened simultaneously, and eleven old manual exchanges were closed down. The transfer to the new system commenced at midnight and was completed in five minutes, the whole operation being entirely successful, so that the Sheffield area now includes the automatic exchanges referred to in Table I. A new manual common-battery exchange, fig. 2, has also been provided, which has 25 trunk positions, 22 "A" positions, 3 junction and miscellaneous positions, and a 16-position monitors' desk for dealing with inquiries.

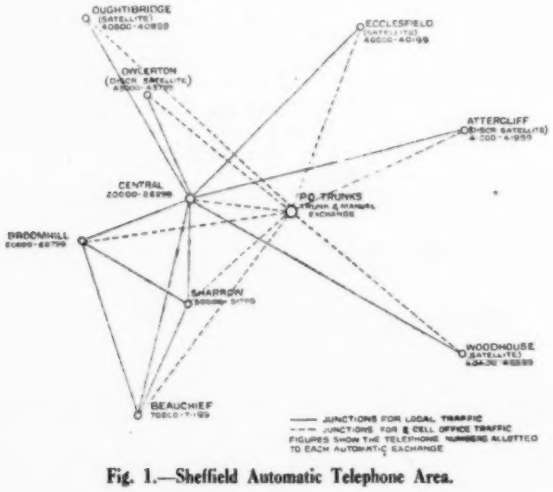


Fig. 1.—Sheffield Automatic Telephone Area.

Table I.

Exchange.	Initial equipment.	Ultimate capacity.
Central	6,300 lines	9,000 lines
Broomhill	2,800 ,,	3,500 ,,
Beauchief	1,200 ,,	1,900 ,,
Sharrow	1,800 ,,	2,600 ,,
Attercliffe	1,000 ,,	1,500 ,,
Owlerton	800 ,,	1,200 ,,
Oughtibridge ...	100 ,,	100 ,,
Woodhouse... ...	200 ,,	400 ,,
Ecclesfield	200 ,,	300 ,,
Total ...	14,400 ,,	25,000 ,,

The new exchanges give a full automatic service within the area, all subscribers being able to "dial" each other and also call direct the new manual exchange which deals with trunk and other calls outside the area, call-office lines, &c. The relative locations of the new exchanges and the inter-connecting junction scheme are shown in fig. 1. Central (fig. 3), Broomhill, Beauchief, and Sharrow are main exchanges, the

Fig. 2.—New Manual Trunk Exchange at Sheffield.

ether five being automatic satellites (fig. 4) of Central: two satellites (Attercliffe and Owlerton) are equipped with discriminators which enable calls between subscribers on the same satellite to be completed locally, instead of using junctions to and from the main exchange; these two exchanges also have direct junctions to the trunk exchange. The other three satellites, on which there is comparatively little local traffic, complete all calls *via* their main exchange. All subscribers' numbers are of five figures: the first digit selects the exchange in the case of calls to subscribers on the main exchange, and either the first and second, or the first, second, and third, in the case of calls to the satellites.

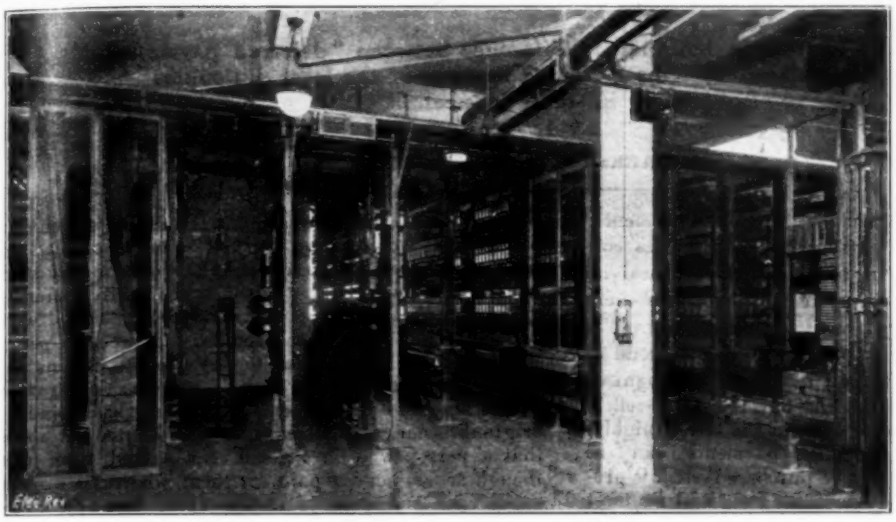


Fig. 3.—A Portion of the Central Automatic Exchange.

Public call offices will continue to be used as though they were working on a manual exchange, telephones at such offices not being equipped with dials; they are joined to their automatic exchange in the same manner as ordinary subscribers, except that their preselectors (*i.e.*, line switches), instead of engaging a free first selector when the receiver is lifted, have direct access to a small group of junctions from their automatic exchange to "A" operators' positions in the trunk exchange. The preselector automatically selects a disengaged junction, and the call is indicated to the "A" operator by a lamp signal and answered on a standard cord circuit. All positions in the manual exchange are equipped with dials which enable the operators to dial direct to any number in the area. The trunk operators can also dial subscribers on the Chesterfield automatic exchange, which is 12 miles distant.

All the exchange equipment was made and installed by Siemens Bros. & Co., Ltd., of Woolwich, being the No. 16 system which is already in use in Edinburgh and at other places.

Additional points of interest of the Sheffield system are the 8-position test desk (fig. 5) at Central, from which all line testing in the area is done, and the arrangements for controlling the battery-charging at the small satellite exchanges, which have no permanent-duty man; at these exchanges the charging current is switched on by hand and is automatically cut off when the battery is fully charged. Most of the new exchanges are housed in new buildings, the largest being Central on an island site near the Cathedral; the automatic equipment, power plant, main frame, &c., were installed on the top floor before the outer walls of the lower floors were filled in.

The street telephone kiosks, of which Sheffield possesses more than any other town, excepting London, will also be converted to the automatic system soon.

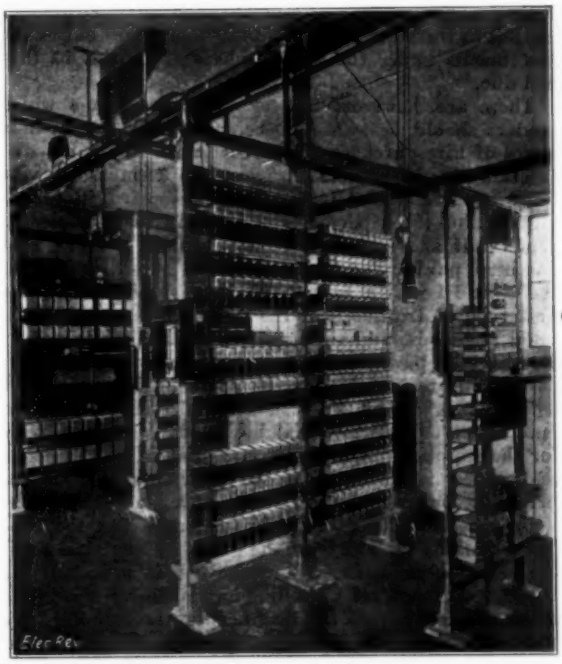


Fig. 4.—Woodhouse Satellite Exchange.

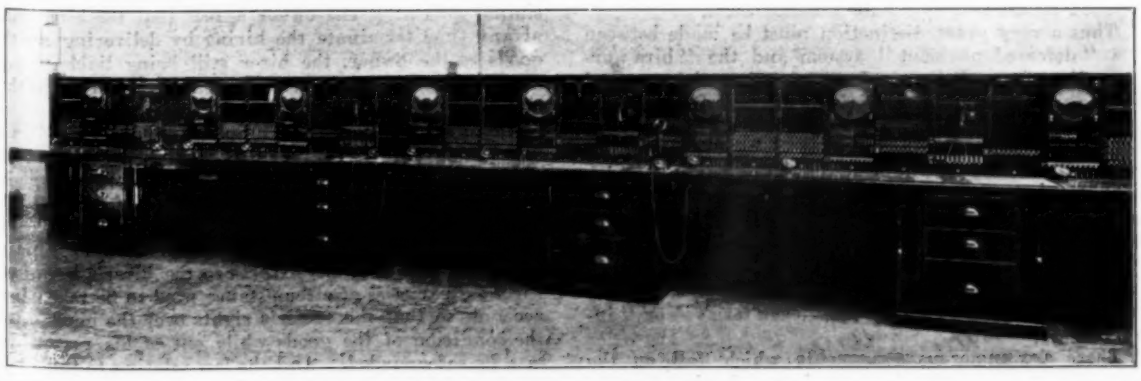


Fig. 5.—Central Exchange 8-position Test Desk, Sheffield.

Easy Payments and the Law.

The necessity for clearly defining the difference between "deferred payment" and "hire-purchase" systems of selling in view of the legal difficulties obtaining in that connection.

By W. ERIC JACKSON, LL.B., Barrister-at-Law.

THERE was a time when the "gradual payment" or "easy terms" system of dealing was confined to the sales of furniture and musical instruments. Nowadays the system extends into every trade, even to wireless equipment and motor-cars. The system, of course, has now passed out of the cloud of suspicion that was once around it, and it is recognised as conferring benefits on both the buyer and the seller. The shortage of money makes difficult the sale of highly-priced articles unless gradual payments can be arranged. Moreover, if the hire-purchase system is properly worked, it should involve no loss, and in most cases a higher profit. The chief difficulty is that the seller has to wait so long for his money; but this is overcome by the existence of finance corporations which are willing to finance transactions of this kind by advancing capital to the seller and recouping themselves out of the instalments under the hire-purchase agreement as they fall due.

There are, however, one or two legal snags which traders should be aware of before setting out upon a series of hire-purchase contracts. First of all, the distinction should be noted between (*a*) a purchaser who buys an article and pays the agreed price in instalments, and (*b*) a person who hires an article, paying rent for it and becoming its owner when so much rent has been paid. The first case is one of ordinary sale, the second is not a sale at all, but a hiring. In the first type of transaction, the supplier loses all hold upon the goods, and the buyer becomes absolute owner. He can sell, pawn, or destroy the goods as he pleases, and is only responsible for the agreed price. Hence it will be appreciated that such a transaction with a fraudulent or unsubstantial buyer offers little security for the supplier. The buyer may dispose of the goods and neglect to pay, and if the seller sues him for the price, the buyer may turn out to be a man of straw.

On the other hand, in a hiring agreement the supplier remains the owner of the goods all the time until the full number of instalments have been paid. If the buyer makes default by selling or damaging the goods or by not keeping up the instalments, the supplier may take back the goods without any obligation to return any part of the money paid. Moreover, the buyer (or hirer as he should be called) can be sued for damages, and anyone to whom the buyer has re-sold the goods can be sued by the real owner for keeping them.

Thus a very great distinction must be made between the "deferred payment" system and the "hire-purchase" system. Sellers are apt to confuse the two, and judging from current advertisements and trade literature, the distinction is not always appreciated. Whether a particular transaction falls within either class will depend on the terms of the agreement, which should always be in writing (although this is not legally necessary) and stamped with a 6d. stamp. Any words indicating that the supplier is to remain the owner, or that the payments are to be for hire and not as payment of the price, will suggest a hire-purchase agreement, but the use of the words "easy terms" or "instalments" will not.

There are numerous agreements which fall on the dividing line between the two classes, having certain features belonging to one class and at the same time having similarities to the other. And the difficulty is not always overcome by the use of such words as are mentioned above. For courts of law do not look at an odd word or two, but to the whole of the circumstances.

It is important, however, that a line should be drawn; for the Sale of Goods Act provides that where a person "having bought or *agreed to buy* goods" obtains possession of them with the seller's consent, any transfer by the buyer to an innocent third party shall bind the original owner. This means, as was pointed out above, that a person who buys goods can re-sell them even though he has not yet paid for them, whereas a hirer of goods cannot dispose of them. If he does, the owner can reclaim them from any person into whose hands they have come.

But the Sale of Goods Act includes persons who have agreed to buy, in the class of persons who can dispose of the goods to a third party. It has been held by the Courts that a hire-purchase contract which provided that the hirer should have the goods, pay rent for them, and become owner when twelve payments had been duly made, was a person who had "agreed to buy," *i.e.*, had agreed to become a buyer when twelve payments had been made. And the same was held in a case where the agreement said that the buyer should, when all the rent had been paid, become owner on payment of one shilling. The result was that the buyer, who had sold the goods to a third party, was able to defeat the owner's rights. The owner could not recover the goods; all the could do was to claim the unpaid instalments.

The point which impressed the Court was that in neither of the above-mentioned cases had the buyer (or hirer) any power to return the goods. The agreement bound him to keep them, pay for them, and ultimately become buyer of them. Hence he was a "person who had agreed to buy."

The Court pointed out that if the agreement had said that the buyer could have at any time returned the goods without being under any further liability, the position would not have been the same. For if a person can send them back at any moment, sacrificing what he has already paid, but being under no further obligation, it seems obvious that he is not a person who has definitely agreed to buy them.

Suppliers should, therefore, make sure that all their hire-purchase contracts contain the following or some similar clause: "The owner agrees that the hirer may at any time terminate the hiring by delivering up the goods to the owner, the hirer still being liable to pay any rent due up to the termination of the hiring in this manner."

There is no doubt that suppliers would be well advised to have their agreements drafted by some competent lawyer who knows the conditions of the trade. Conditions vary according to the type of goods sold; some goods deteriorate quickly, some are liable to damage, some require frequent adjustment or repair, and others are fitted as fixtures to the hirer's premises. All these varieties of circumstance need to be taken into account, so that the owner's rights over the goods, and the condition of the goods while out of his possession, may be safeguarded. And the law relating to this class of transaction is full of difficulties for the owner, without adding to them by blunders in the agreement.

The Electrical Industry Reviewed.

The Annual Report and Meeting of the B.E.A.M.A.

WE have received a copy of the speech delivered at the annual meeting of the British Electrical and Allied Manufacturers' Association, held on March 17th, by the Chairman, Lt.-Col. R. K. Morcom, C.B.E. The Press luncheon, at which the chairman's speech has been given for several years past, was not held this time. We give an abstract of Col. Morcom's review and our usual full summary of the report of the Council. The report does not on this occasion mention whether there was any change in the total membership during 1926. Col. Morcom has been re-elected Chairman of Council for the third year.

The Electrical Industry in 1926.

By LT.-COL. R. K. MORCOM, C.B.E. (*Abstract.*)

At the beginning of 1926 the factors favouring an expansion of trade justified optimism; but any forecast was bound to be overshadowed by the menacing situation in our coalfields and the artificial stimulus to German activities inherent in the Dawes Scheme. During the year, inflation in France and Belgium increased the adverse factors through the consequent increase of production in those countries. Nothing but a rapid increase in world demand could possibly prevent a serious over-production crisis in Europe. Unfortunately, on a falling market demand always lags. As a result there was soon acute depression in Germany, and a threat of acute depression in all producing countries. It might have been possible to curtail production by international agreements, but, as these were either impossible or undeveloped, it soon became obvious that the coal strike could by no means be averted. This had the effect of cutting down our production to such an extent as to save Europe from catastrophe, but at terrible expense to Great Britain. France and Belgium showed a steady increase in production, and Germany made good her initial depression. Only late in the year, Italy suffered from an adverse credit position. Outside Europe, Chile suffered severely, both from the rapid decline in the price of copper and the keen competition of German potash. In Argentina, the meat war continued to be a cause of depression. In Brazil, futile attempts at stabilising the milreis still restricted trade. There was an increased producing power of the Indian people, which, along with the stabilisation of the rupee, produced an active market. The United States, with its tremendous internal wealth, produced record results in almost every industry.

The two dominating factors have been the coal crisis and the Electricity Supply Act. The shortage of fuel due to the strike brought into great prominence the efficiency and economy to be derived from electrification; the highly-electrified industries were able to keep up their outputs with few exceptions. The electrical manufacturers themselves were able to do a large turnover during the crisis, and only in the autumn began to feel the pinch of inadequate steel supplies.

The passing of the Electricity Supply Act co-ordinates the problem of generation and transmission of electricity in this country, and ends the uncertainty of the previous four years. The Association supported the Bill and can take to its credit several good features embodied in the Act. The influence of the national scheme will clearly be felt more directly by makers of heavy generating plant, cables, and switchgear, than by the makers of small plant, but the fear that the extension and installation of private generating plant will be much affected is probably groundless. It is very improbable that the coal, iron and steel industries, and those requiring process steam, will find any advantage in taking power from the network.

Industrial power stations should be encouraged to provide power supplies for their own requirements from waste gas or low-grade fuel or as a by-product of process steam. Such surplus, if it could be absorbed into the distributing network, would increase the overall efficiency of generation. The Central Electricity Board has full powers to encourage development on such lines. The definition of costs of production in the generating stations is such as to allow a fixed and equitable return on capital expended or invested. This should encourage the use of plant of the highest efficiency and durability, and discourage the purchase of inferior plant merely to incur low initial outlay.

During the acute depression the electrical industry was the one bright spot, and certainly in generating plant, transformers, switchgear, control gear, and meters, there was a good increase in turnover. Unfortunately, in industrial motors there was again a serious decline in orders. Such a decline means that our other industries are insufficiently electrified, and are thus handicapped in the fierce race of modern trade. The electric motors installed in industry in the United States were actually 22,247,660 h.p. in 1924, and are estimated to exceed 24,000,000 h.p. to-day. The German census of 1925 shows 13,000,000 h.p., while, in this country, a maximum estimate is 5,000,000 h.p., of which our three large industries, iron and steel, coal, and textiles, account for 2,800,000 h.p.

Generally the turnover for the industry in 1926 was a record, but the record was really by way of an overflow of pent-up waters. The demand for electricity was increasing at the rate of 700,000,000 kWh per annum, sufficient to cause a demand for 500,000 kW of new plant, apart from renewals. Probably 600,000 kW total should have been required for public supply alone. Actually, the total sanctioned by the Electricity Commissioners averaged 425,000 kW for the period 1920-25, while for 1925-26 585,700 kW was sanctioned. We seem to show a deficit of at least 600,000 kW from normal, and this deficit will have considerable influence on the trend of our business. This country is not spending enough on its electrical development. In the United States, public utility companies raised £300,000,000, while here the maximum annual expenditure on generation, transmission, and distribution is about £30,000,000. Allowing for the difference of population, we are only spending 25 per cent. of what we should compared with the U.S.A. There is hope of rectifying the position, for a number of super-power stations have been begun or projected, aggregating 2,000,000 kW at full development.

The British electrical industry has been able to maintain its position as leading supplier of electrical goods abroad. The Monograph submitted to the International Economic Conference shows how, compared with Germany, the United States, and Switzerland, we have moved much more rapidly since 1913, and strengthened our hold on overseas markets. In seven years we have supplied generating plant aggregating almost 2,000,000 kW, and the results obtained from such plant have been sufficient to create a tradition of high operating efficiency in every part of the world. In traction, in control and switchgear, in transformers, the same record has been achieved, and the electrical industry, with exports totalling £18,194,000 in 1926, takes first place among the engineering exporting industries of this country. Competition was felt most in South America, India, and Australia during 1926, and, in each case, the United States constituted the main opposition. With the possible exception of Australia, which is still supporting United States products in many branches of the industry, the British manufacturer was actually able to improve his position in almost every market. In Brazil, in Argentina, in Chile, in Japan, and even in Canada, the relative position occupied by Britain showed a considerable improvement. Trade is being resumed also with the Continental countries, and a number of important orders, which would otherwise have gone to Germany or the United States, were secured, especially in Spain and Central Europe. Our financial resources are great enough to ensure us a preferential position, and are now being employed with favourable results in Eastern and Central Europe.

Looking at the general industrial situation, the indications do not seem to be towards any great expansion of trade. A certain number of orders held up by the coal stoppage and now placed give an appearance of activity to certain areas, but behind it all lies the great shadow of serious world under-consumption of basic products. And in this restricted market our powerful competitors make it certain that our difficulties will become increasingly great. German industrial firms have borrowed from the United States over £60,000,000 worth of new capital, the main industries affected being coal-mining, iron and steel, electricity supply, and electrical manufacture, while the financial resources of the country have increased so greatly that the manufacturers can obtain advances at a discount rate even less than that ruling in this country. A year ago, the German manufacturer had to pay at least 10 per cent. for such accommodation, but now he can obtain it easily at 4-5 per cent. This is a factor of very great importance indeed in important long-term contracts.

Another factor that has assisted the German manufacturers, particularly the electrical manufacturers, is the closeness with

which the financial policy of the State has adapted itself to industrial policy. As an instance, the Russian credits totalling £15,000,000 with State support have enabled German industry to adopt a very forward policy in the Russian market. In the present state of demand, it seems wise to encourage any market that has great expansive possibilities. The realisation of stable monetary conditions on the Continent has been attended by an increase in unemployment. The growth of rationalisation, the development of horizontal trustification in Germany, accompanied by amalgamations on a large scale, and the formation of a number of international agreements have tended to bring the main industrial countries of Europe into close contact with each other, with the result that something like a European economic *bloc* is emerging.

The artificial aids to competitive efficiency represented by currency depreciation and inflation generally have now been practically removed, but in their place has come a more determined Protectionist policy and a movement towards association of producers, both technical and financial. There are signs also that a number of important markets are suffering from depression—Japan, China, Chile, and Egypt, chief among them. The great upward movement in American production has come to an end, activity in January being the lowest recorded for the last three years.

Until prices move upwards again, which possibly may take place towards the latter half of this year, it is difficult to see how demand on export account will improve; our prosperity as an industrial and trading nation depends on continuous activity in world trade. The Dawes Plan represents a great menace to British exporting industries. We can feel it already in the intensified competition which we are suffering from Germany, while it has served to bring France, Germany, and the United States into closer co-operation with a view to dominating the world markets. Germany has already made inroads on our position in cables and industrial motors, though we have held our own in generating plant and traction material. But it is essential that we should work at maximum efficiency and retain our position. The best means to such an end is to strengthen and develop the home market. In the heavy sections, the programme already sanctioned, and those which will be stimulated by the operation of the Electricity Act make an improving home demand probable. The new spirit, which the discussions on the Act have encouraged, and the need for bringing industrial plants up-to-date, should stimulate a revival in demand for medium and small size plant. In particular, all possible should be done to stimulate the demand for industrial motors, and so not only reduce the depression of that section, but put them in a position to face world competition on the basis of a home demand more comparable with that enjoyed by their great rivals.

The Council's Report.

THE Council commences its report by stating that, though 1926 began with every indication of expanding trade, it was one of the most disappointing in post-war history. The coal stoppage and the general strike brought industrial production almost to a standstill; trade suffered both from the interruption of manufacturing activity and from the diversion to competitors of orders in many important markets. Complete recovery will take some time, but the opinions of leading banking and industrial authorities indicate hopeful prospects of trade revival.

"The creation of stable currency systems in Europe—France and Italy alone have not taken steps to stabilise financial conditions—points to the elimination of unfair competition based on currency depreciation, and an improvement in the competitive situation so far as the British manufacturer is concerned. The rapid fall in prices of many basic commodities such as copper, cotton, lead, rubber, and chemicals, has contributed to a slight decrease in material costs, but, on the other hand, has weakened the economic and financial position of many markets, such as Chile, Central Africa, Egypt, and made overseas demand less active." The electrical industry, due to the fact that many plant extensions could no longer be delayed pending the new supply legislation, was an exception to the general depression, and reported an increase both in turnover and in orders received. The passage of the Electricity (Supply) Act released several large power schemes, and there is hope of increased activity during 1927, provided that all sections of the community realise the necessity of working together towards stability. The B.E.A.M.A. office accommodation was increased during the year.

Sir Robert Horne, P.C., M.P., Mr. Emile Garcke, and Mr. C. P. Sparks have been elected vice-presidents. Captain R. S. Hilton, managing director of the Metropolitan-Vickers Electrical Co., Ltd., was elected vice-chairman of Council in June, in place of Mr. P. J. Pybus, who retired on becoming chairman of the English Electric Co., Ltd.

The Electricity (Supply) Bill) came into force as an Act on January 1st of this year. "It is obvious that developments will take some time to mature under the Act, and an effort will probably be made, first of all, to determine the seven electricity districts still in abevance and to complete the series of 15 districts into which Britain has been divided, before any steps will be taken towards realisation of a plan of national co-ordination."

A tribute is paid to the director, Mr. D. N. Dunlop, who, with the sanction of the Council, brought together the various bodies in the electricity supply and contracting branches of the industry, with the result that their interests were reconciled and an agreed clause was presented to the Ministry of Transport, which now stands as Clause 48 in the Act.

Since the last Annual Report, the enlarged British National Committee referred to therein has assumed responsibility for the participation of Great Britain in the future activities of the World Power Conference; the director is chairman of this Committee. The first sectional meeting of the World Power Conference was held at Basle, Switzerland, during the year, and the Sectional Meeting on Fuel Problems will be held in London in September, 1928, under the auspices of the British National Committee.

The report refers to the monograph on the electrical industry, prepared in connection with the International Economic Conference of the League of Nations, which was reviewed in the ELECTRICAL REVIEW, March 4th, p. 329.

The Economic and Statistical Department of the Association considerably extended its range of activities during 1926. It has kept in touch with financial and commercial interests; it has been consulted by international bodies, such as the International Economic Conference, regarding developments in industry; has furnished information to the International Labour Office and the Board of Trade Committee on Industry and Trade; has exchanged statistics with leading associations in other countries; and serves to guide the course of expert opinion on the electrical industry.

Reference is made to the various publications issued by the Committee, and to the various articles in newspapers at home and abroad regarding the British electrical industry. The advertisement campaign of the Publicity Department directed to increasing the prestige of the industry is mentioned. The same department supplied information to other associations in support of electrical development, and was active in many of the Dominions, syndicating special articles and notices dealing with the electrical industry. In conjunction with the Economic and Statistical Department it has been working to create an atmosphere favourable to intensive electrical development and the realisation of large power schemes, both at home and abroad.

The sixth annual report of the Electrical Research Association makes it clear that the E.R.A. has now thoroughly established its usefulness. The Council regards the work of this Association as of national importance.

The scheme of educational scholarships, which has been in successful operation for the last six years, was brought to a conclusion during the year, the funds for it having come to an end. The Committee has laid down lines for an enlarged scheme, which proposes to open out the awards both as to subject-matter and the field from which candidates may be drawn. The number of oversea students in members' works at the close of the year was 162, a decrease of 22 on last year's return.

With regard to conditions of contract, the report says:—"The routine work in the legal department is reported by the solicitor as having been normal during the year, but he desires to draw the particular attention of members, when examining their contracts, to the preliminary portion of them embodying what is known as the 'Agreement.' The 'Agreement' always refers to the set of conditions 'annexed hereto,' and not infrequently it happens that it contains clauses which are contrary to and *override* those conditions. Such words are sometimes overlooked by the examiner of the contract, once he has been satisfied that the conditions annexed thereto are in order. Particular care should therefore be taken in reading the 'Agreement,' and any dubious points referred to the Association. No alterations in the text of the I.E.E. model sets have been proposed during the year."

An important addition was made to the Council's "Instruction to Members" in regard to fair-wages clauses. After 12 months' experience of the voluntary use of two out of the three well-known clauses and several years' experience of the first (*i.e.*, dealing with labour in the factory), the Council decided that all these clauses should be made mandatory, and accordingly that rule was put into effect last autumn. "No serious difficulty has yet been encountered, and it is hoped that in due time most public bodies will follow the lead of the chief railway companies in arranging to accept clauses which, unquestionably, are, as their title correctly implies, 'fair' both to purchaser and contractor; and will, if not already in accord, gradually alter their standing orders to admit of their use."

An outstanding feature in connection with standardisation work during the year was the plenary meeting of the International Electrotechnical Commission held in New York in April. "An important principle recognised was that temperature *rise* (and not *total* temperature) is the fundamental basis of the I.E.C. rules for rating. It is gratifying to know that British practice, as enunciated by your representatives, is having its due influence on international standardisation."

The Standardisation Committee has completed a draft set of rules covering the method of declaring efficiencies for motors and generators, transformers, rotary convertors, and motor convertors. The draft was submitted to the I.E.C. and was referred to the National Committees for consideration.

Researches conducted by the E.R.A. on flameproof enclosures have made it possible to adopt a definition of flameproofness which has been embodied in a British standard specification. Specifications for flameproof apparatus are now under consideration.

During the past year the B.E.S.A. has registered "BESA" as a trade mark to be used on articles which comply with the appropriate British standard specification. Licences for the use of the mark are granted only under such conditions as will ensure that the articles so marked do actually comply. The introduction of this trade mark should be of the greatest service to British manufacturers.

A specification for lighting and power transformers which is the result of several years' work on the part of the Transformer Technical Committee is regarded by the B.E.S.A. Electrical Sectional Committee as one of the finest technical productions yet issued by that Association.

During the year the Traffic Committee continued its collaboration with the Traders' Co-ordinating Committee in opposing the Schedules of Standard Charges, submitted to the Railway Rates Tribunal by the railway companies. Its members also prepared special evidence on the companies' proposals with regard to Part 6 of the Schedules, which deals with "Merchandise of an exceptional character sent by merchandise train." In this term are included pieces of machinery exceeding 12 tons in weight. At the present time pieces of electrical machinery in excess of 10 tons in weight are surcharged on a rising scale, referred to as "The Heavy Weight Scale." Certain classes of machinery are exempt from these surcharges, being permitted to take advantage of a "mileage scale of charges." Under the schedules the mileage scale is to be abolished, and all pieces of machinery exceeding 12 tons will be subject to surcharge. The Committee regards these surcharges on electrical machinery as unjustifiable, and as a result of interviews with a committee representing the railway companies, it was agreed that the minimum weight should be raised from 10 to 12 tons, and that the surcharges should be imposed, not on the total weight, but on the excess weight over 12 tons. The companies further conceded the principle that the surcharges should not take the form of a percentage addition to the standard charges, but should be based on a sliding scale in which the price per ton per mile decreased with increasing distance. At a later stage the companies submitted to the Tribunal their proposed scale which commenced at 7d. per ton per mile for the first 10 miles, and decreased to 1d. per ton per mile for distances exceeding 100 miles. The Committee resisted these proposals, and the evidence submitted to the Railway Rates Tribunal, supported by considerable data in the form of tables and charts, showed that whilst relief had been given to purely electrical machinery, the new surcharges imposed on prime movers would, in many cases, make the cost of transport on a combined generating set greater than before. The railway companies then voluntarily agreed to reduce the proposed scale by 33⅓ per cent., and this reduction has since been confirmed by the Tribunal. The effect of this decision will mean that the carriage charges to be paid by the heavy-plant sections of the Association will be, at least, £3,000 per annum less than would have been the case under the railway companies' proposals, and will, in the majority of cases, be below the present charges. At the present time the difference between the charges at companies' risk and owner's risk is of the order of 10 to 20 per cent., depending on the class of goods, but in the companies' proposals the deduction is of the order of from 2½ to 12½ per cent., and the greatest volume of traffic will be carried in those classes for which the proposed allowances are respectively 2½, 3¾, and 5 per cent. The Committee will collaborate with other trading interests in resisting these proposals, but it is hoped that some satisfactory arrangements may be arrived at without having recourse to litigation. In settling the revised Classification of Merchandise, the Committee succeeded in obtaining modifications of the companies' proposals which will be of considerable benefit to members of the Association. Among these modifications was a lower classification of steam condensers, representing a saving in transport charges of about 20 per cent. The Committee has also been successful in obtaining a revised classification for ironclad switchgear.

The Committee reminded members that as their ordinary shipping policies did not protect them against damage due to fire and other causes which might occur in railway or dock warehouses in which their goods might be stored awaiting lifting on board, they should cover this risk by insurance.

In order to put an end to recurring disputes regarding loss and damage an agreement has been made under which, subject to certain conditions, the railway companies will pay the net loss less 10 per cent. when the goods are carted by the trader at one end of the journey, and less 15 per cent. when cartage is performed by the trader at both ends. This agreement came into force on October 1st, 1926.

The Export Committee gave further attention to the question of amendments to Dominion Customs duties, particularly those in Australia. To ensure adequate support for the memorandum transmitted to the Australian Customs authorities, those members interested in Australian business decided to appoint in Australia an Australian tariff expert to support the views put forward in the memorandum. Progress cannot yet be reported, but the effort is being maintained. The question of the import duties on catalogues charged under the Australian Customs tariff also received careful consideration with a view to action. During the year there were two conferences of all members of the Association known to be represented in Australia.

The two new sets of conditions of contract, to govern f.o.b. and c.i.f. contracts, were still under discussion by the appropriate I.E.E. Committee when this report went to press. The Export Committee devoted a considerable amount of time during the year to the conditions of the India Stores Department, and had the attendance at once of its meetings of Colonel Pitkeathly, chief engineer of that department, who, after hearing the manufacturers' views, undertook to give careful consideration to the Committee's suggestions for amending the department's conditions. The Committee also secured the interest of the chief inspecting engineer of the Egyptian Government in respect of conditions of contract.

In place of the November meeting of the Export Committee a conference was held of all members of the Association, known to be interested in Indian business, when Mr. T. M. Ainscough, H.M. Senior Trade Commissioner, Calcutta, gave his views regarding the present position and prospects of the British electrical and allied industry in India. Mr. Ainscough also urged that some arrangement should be made for the systematic training of accredited Indian students. The Export Committee joined in the general protest against the continuation of the Anglo-Spanish Commercial Treaty in view of the very high duties imposed by decree.

The Standard System of Cost Accounting in the Electrical Industry, prepared by the Estimating and Accounting Committee, has been completed, and is in the hands of members. The Council believes that its general adoption as a basis of costing will lead to greater efficiency in the industry.

The activities of the Electrical Development Association are briefly indicated in the report. Its supply membership at December 31st was: Municipal, 150; company, 125; colonial, 4; total 279; an increase of 27 on the preceding year. Its principal activity during 1926 included the organisation of the great campaign.

The following exhibitions were, during the year, made free to members under the Exhibition Standing Rule: Smoke Abatement Exhibition, Birmingham; Physical Society's Exhibition; Better Housing Exhibition, Glasgow; Clean Foods Exhibition, Cardiff; Heating and Cooking Exhibition (Clyde Valley Power Co.), Helensburgh; Heating and Cooking Exhibition, Pudsey Corporation; Office of Works Industrial Exhibition; Bakers' Exhibition, London.

The Council acknowledges the assistance received from other institutions.

Practical Results with Chromium Plating.

Under this title the *American Machinist* abstracts a paper read before the S.A.E. at Detroit, in which Mr. W. N. Phillips states that chromium plating has been used for considerably over a year on the Oldsmobile radiator. The method used is to produce as smooth a surface as possible, and then apply a light coating of chromium. In order to get this smooth surface, it is the practice to copper- and nickel-plate the steel parts; then, after the articles have been buffed to a high finish, a light coating of chromium is applied. It is somewhat difficult to produce nickel plating under 0.001 in. thick that will stand a salt spray test of 15 hours. However, a steel base, plated with this amount of nickel, then chromium plated, will stand 80 to 100 hours of salt spray test.

The chief material used in chromium plating is chromium trioxide, which can be purchased at about 35 c. per lb., with the possibility that, as the use increases, the price will decline. In applying chromium, high current densities are used with very short emersions (*sic*).

On plug gauges, thread gauges, and the like, the use of chromium has been very successful. The gauges are ground about 0.0005 in. undersize, then brought up by plating an excess of chromium, and later ground to size, or by plating the gauges exactly to size. When the gauge has finally worn out, it is stripped and a new coating of chromium applied. It is thus possible to use the same gauge for an indefinite period. It is in this work that the control of hardness is of particular importance. It has been possible to produce gauges that last from 2 to 25 times longer than the best steel gauges with one plating.

Owing to the low coefficient of friction between chromium and other metals, chromium has been applied for burnishing tools with a great deal of success. Files used for cutting soft metals can be chromium-plated with great advantage, inasmuch as the metal does not clog up the file.

It is necessary to back up chromium plating with hard metal, if the article plated is to be put to hard usage. In other words, if the impact is great, the steel parts should be carburised before applying chromium.

Hardening Copper.

The discovery of a new process for hardening copper was recently announced at a meeting of the American Institute of Mining and Metallurgical Engineering. Mr. M. G. Corson, a consulting engineer, who invented the process, explained that the copper was hardened by an alloy of 5 per cent. nickel and about 1 per cent. silicon, heated to various high temperatures. Virtually, the same principle was used as in making duralumin, another hard metal.—*Reuter's Trade Service* (New York).

Business and Industrial Notes.

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Campaign Notes, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations and Failures.

The E.D.A.-E.L.M.A. Campaign.

According to the official report for the week ended March 19th, 90 electric demonstration houses have now been opened, and it is conservatively estimated that 1¼ million people have visited them. During last week houses were opened at Ipswich, Paisley (Ralston), and Stoke-on-Trent (two). Further houses are to be opened shortly at Whitley Bay, Malton, Heaton (Newcastle), Saltburn, Birmingham, Tamworth, West Hartlepool, and Annfield Plain. The following attendances are recorded at some of the demonstration houses:—Paisley, 400 a day during the first four days; Aberdeen, 16,736 in 16½ days—over 10 per cent. of the population; Glasgow (Minard Road), 12,133 in 12 days; Potteries, 1,000 on opening day; Chorlton, average over 1,000 a day. Between 8,000 and 10,000 people visited the four-day exhibition at Dumfries, and the results are said to be satisfactory. Recently a special effort has been made to interest school children in the better home-lighting competition, and applications have been received for nearly 80,000 booklets. The E.D.A.'s stock of posters, window bills and supplementary literature is practically exhausted; only a few hundred are left. Ballot papers have been coming in lately at the rate of two or three thousand a day; it is now certain that the public response to the competition compares favourably with any similar trade effort ever made in this country.

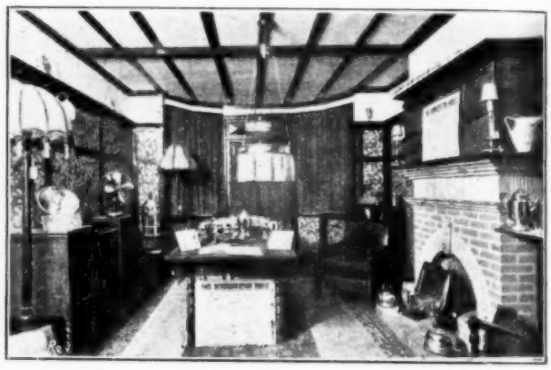
No. 8 of "Home Lighting News" calls for a big final "push" by electricity suppliers, contractors, and retailers. To encourage an effort E.D.A. offers to those who have previously ordered competition booklets, 50 per cent. of the number free of charge upon application. The March window display is dealt with; this concentrates upon spring cleaning, and is devoted to a contrast of ancient methods with the modern (vacuum cleaner) way of doing the work.

We reproduce herewith views of two of the demonstration houses equipped in connection with the Campaign.

The Carlisle Demonstration House.

The first is that at Carlisle, and appears to be a typical middle-class home, representative of a vast number.

The other house is at Hendon and our view shows the dining room containing a large number of electrical appliances, including five types of lighting fittings, and a number of table devices.



The Hendon Electric Home.

Another illustration is a night view of the South Shields Electric House. This is of the modern semi-detached villa type, and on the ground floor are a drawing room, dining room, kitchen, and scullery; upstairs there are a front bedroom, small front bedroom, and back bedroom, together with bathroom, &c. The house was loaned by the builder on completion. The wiring was carried out by a local firm of contractors, and the fittings, cooking apparatus, &c., were from several manufacturers. The furnishing was done by a local firm. The house was formally opened by the Mayor (Councillor J. Ranson) on March 9th. After the opening and inspection of the house, those invited were entertained to tea. The number of people who visited the house on the first day was 3,000. Up to March 17th the total number of visitors was 13,588. Attention was drawn to the house by a number of effective methods. The whole of the work was carried out by the local circle in conjunction with local wiring contractors and other co-opted members.

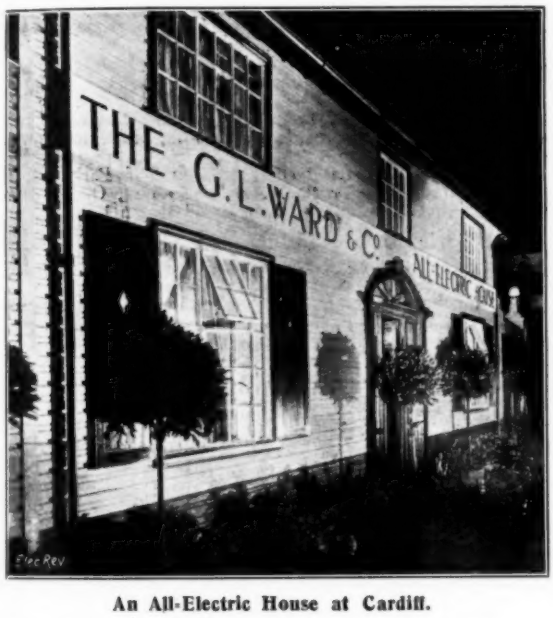
An All-Electric House at South Shields.

An all-electric house was formally opened at Taunton by the Mayor on March 11th. The exhibition was organised by the Taunton Electric Circle and domestic labour-saving devices, together with a variety of other electrical appliances, are included in a very complete display.

Two neighbouring all-electric houses were opened at Shelton, Stoke-on-Trent, on March 17th, and they are to remain open until the end of the month. The houses were erected by the Corporation Housing Committee and furnished by two local firms. The electrical equipment was supplied by the City Electricity Department. A leaflet is being distributed giving some details of the exhibition and also calling attention to the Campaign competition. The local Press has been freely employed to advertise the houses, and one advertisement gave the names and addresses of 22 electrical contractors, &c., from whom competition booklets can be obtained.

Local Exhibitions.

CARDIFF.—The accompanying picture shows the Cardiff all-electric house, to which we recently made reference. It was erected by Messrs. G. L. Ward & Co., and furnished and



An All-Electric House at Cardiff.

equipped by Messrs. David Morgan in conjunction with the builders. In its general design it followed the lines of the prize house which is being awarded in connection with the E.D.A.-E.L.M.A. Campaign.

YARMOUTH.—An electrical exhibition, organised by the Electricity Department, was held at Yarmouth from March 15th to 24th. A number of local electrical contractors co-operated, and the products of several national manufacturers were displayed. A booklet was issued for the occasion in which were set out full particulars of the Corporation's service as well as the advantages of "doing it electrically." Cooking demonstrations were given by a representative of the Jackson Electric Stove Co., Ltd., whose cookers form a part of the Corporation's hiring scheme.

Electric Power in Industry.

The fourth preliminary report upon the Census of Production, 1924 (published with the *Board of Trade Journal* for March 17th), shows that in the coal-mining industry generating plant of a total capacity of 778,363 kW was in use during 1924 (as against 151,000 h.p. in 1907). The total power of electric motors installed was 1,568,360 h.p., and power for 1,030,139 h.p. of these was generated by the industry itself. In 1907 the aggregate h.p. of electric motors installed was 492,000. Electricity to the value of £112,000 was sold by the industry during 1924. The coke and by-products industries reported generating plant with a total capacity of 37,264 kW. The installed electric motors had an aggregate rating of 69,043 h.p. The manufactured fuel trade possessed 2,983 kW of generating plant (against 239 kW in 1907), and had 5,525 h.p. of electric motors installed. The generating plant installed in the railway carriage and wagon-building trade aggregated 15,207 kW (against 8,168 kW in 1907) and the industry had 62,506 h.p. of electric motors.

Recent Contract.

MESSRS. E. A. LANGRISH & CO., LTD., Wardour Street, W.1, have obtained a contract for installing complete kinematograph equipment at the Nottingham City Mental Hospital, Mapperley. This is only one of the many similar installations carried out during the past few months. The projector outfit supplied is a "Kalee" all-British No. 7 model of the rear-projection type, the projector being placed at the rear of the screen.

Commercial Electrical Travellers.

The Electrical Trades Commercial Travellers' Association held a successful carnival dance at Victory House, Leicester Square, on Friday evening last, about 100 members and friends being present. Despite the mild weather, exponents of the Charleston were indefatigable, and Mr. Tom Dally's orchestra, which once again provided the music, was busily employed in meeting their demands. The profuse distribution of fantastic paper hats and other novelties enlivened the proceedings, which were consecrated by the singing of the Frothblowers' Anthem. The catering, as usual, was excellent, and Mr. Moir, hon. secretary, and those who assisted him in making the arrangements, are to be congratulated on their efforts.

Power in Factories.

The monthly *West Ham Power and Factory Gazette*, published by the West Ham Electricity Department, contains particulars of factories and factory sites available in the district, as well as numerous illustrations of the application of electric power to industry. Full details of the Department's service are included.

Employment During February.

The March *Ministry of Labour Gazette* states that employment in the engineering industry continued to improve during February in all parts of the country. The general percentage of unemployed fell from 13.1 in January to 11.6. In the electrical engineering branch there was a fall in unemployment from 6.8 to 6.5 per cent. Upon the other hand, the two other principal electrical groups showed a decline in employment. In the electrical wiring and contracting industry the unemployment figure was 8.9 per cent. (against 8.0 per cent. in January), and in the electrical cable, wire and lamp manufacturing group it was 8.6 per cent. (against 8.3 per cent). The actual numbers of unemployed were as follows:—Electrical engineering, 4,995; wiring and contracting, 1,237; and cable, wire and lamp manufacturing, 7,595.

Cheaper Electric Lamps Wanted.

A plea for cheaper electric lamps was made by Mr. E. Cross, the Rotherham electrical engineer, at the annual dinner of the Sheffield branch of the Electrical Contractors' Association last week. They were now getting a class of consumer of electricity, he said, who could not afford to pay 3s. or 3s. 6d. for a lamp. It would pay manufacturers to sell lamps cheaper and, in consequence, more of them.

Unemployment.

The fall in the number of employed continued during the week ended March 7th, when a reduction of 25,380 was recorded. The actual total was 1,144,100, as compared with 1,169,480 on February 28th, and 1,094,082 on March 8th, 1926.

A "Rawlplug" Competition.

In our advertisement pages to-day details are given of a competition which is open to all users of "Rawlplugs," and particularly electricians. A number of attractive cash and other prizes are offered.

The Japanese Earthquake.

The recent severe earthquake in Japan caused comparatively little damage, the total being officially put at 10 million yen. The property of the Tokyo Electric Light Co. was not seriously affected; the estimated cost of the damage done is stated to be £4,000.

Metropolitan-Vickers in Russia.

The Times reports that a five-year agreement between the Leningrad Machine Trust and the Metropolitan-Vickers Electrical Co., Ltd., has been approved by the Soviet People's Commissars. The Trust obtains access to all the Vickers laboratories, workshops, and technical offices, as well as to all patents. Messrs. Vickers will send to Russia a certain number of engineers, mechanics, and technical *personnel*.

Lamp Manufacture in Russia.

In order to render the country less reliant on foreign tungsten wire, for use in the manufacture of electric lamps, plant for its production has recently been installed at the Baskakow cable works in Moscow, where about 328,000 ft. per month is now being turned out. A tungsten wire-making plant is also being established in the old Provodnik works, Leningrad.

Proposed New French Customs Tariff.

The *Board of Trade Journal* for March 17th was accompanied by a translation of the first part of the new Customs tariff which the French Government has under consideration. The principal object of the revision is to ensure, for a number of years, the defence of the national industries. An important feature of the new tariff is the provision made for the periodical adjustment of the rates of duty in relation to changes in the general level of wholesale prices.

The National Radio Exhibition, 1927.

The Radio Manufacturers' Association states that full particulars of the 1927 exhibition will be published in the course of next month. It is the intention of the Association to afford its members special facilities on one day to view the show.

North Metropolitan Progress.

The Spring Number of "Use Electricity," published by the North Metropolitan Electric Power Supply Co., shows that during 1926 no fewer than 7,274 new premises were connected to the company's system. In the same issue are articles upon the company's demonstration houses; the electric kitchen; shop-window lighting, &c.

Trade Announcements.

Mr. Frank Gilman has removed his office to Grange Works, Grange Road, Smethwick.

Mr. A. J. Wells, electrical and radio engineer, has opened new premises at 5, Crawley Green Road, Luton, Beds.

The Electricity Distribution of North Wales and District, Ltd., is shortly opening offices and showrooms at Nantwich.

Messrs. Kent Bros. Electric Wire Co. & E. H. Phillips, Ltd., state that on April 1st their registered offices and stores will be removed to West Park Works, Mortlake Road, Kew Gardens, Surrey ('phone: Richmond 3941). For local customers a stores will be retained at 43, Berners Mews, London, W.1.

As from to-day, Mr. A. J. Makower's address will be: 200, High Holborn, W.C.1. Telephone: Museum 4265.

Catalogues and Lists.

Messrs. F. & A. Parkinson, Ltd., Guiseley, Leeds.—A blotter advertising the company's motors and bearing a view of the works.

Volta, Ltd., Kern House, 36-38, Kingsway, W.C.2.—Two pamphlets addressed to retailers dealing with the company's sales policy, and three illustrated leaflets describing "Volta" vacuum cleaner attachments. Also an adhesive stamp advertising the "Volta."

Messrs. Walter McGee & Son, Ltd., Albion Works, Paisley.—Leaflets Nos. 110-114, illustrating and describing "Emcol" a.c. motors, including a special flameproof (mining) type.

The General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.—A priced and illustrated catalogue of ironclad switch- and fuse-gear. Views of the company's Witton works are included.

Messrs. Royles, Ltd., Irlam, near Manchester.—A folder advertising the company's water and air heaters, strainers, &c.

Messrs. Tipper Bros., Bradley Bridge Tube Mills, near Bilston, Staffs.—A pamphlet advertising the firm's "Tibro" electrical conduits ranging from ½ in. to 2 in. external diameter.

Messrs. A. H. Hunt, Ltd., Tunstall Road, Croydon.—A sample of "Clutch" insulating tape, a feature of which is the retention of its adhesive properties for a very long period.

Mr. Alan Wright, 124, Chancery Lane, W.C.2.—A cut out containing details and prices of "Inventum" electric cisterns and arranged for overprinting.

Pritchett & Gold & E.P.S. Co., Ltd., 50, Grosvenor Gardens, S.W.1.—A brochure containing very full particulars of the construction and manufacture of the company's accumulators for train lighting.

Mr. Charles Selz, 47, New Cavendish Street, W.1.—A leaflet bearing a view of Mr. Selz's showrooms, and (on the reverse) a guide to their position.

The Benjamin Electric, Ltd., Brantwood Works, Tariff Road, Tottenham, N.17.—A priced and illustrated folder describing "Bencolite" units for artistic lighting.

Messrs. Ernest F. Moy, Ltd., Greenland Place, Camden Town, N.W.1.—Sheet No. 150, containing an illustrated description of the company's large motor-operated rheostats. The example depicted has a capacity of 470-160 A, and a resistance of 1.1 ohms.

Houghton-Butcher (Gt. Britain), Ltd., 88-89, High Holborn, W.C.1.—"Houghton's Radio News" for March, containing details and prices of radio apparatus, special lines for retailers, and illustrated articles on selling, &c.

The Vaughan Crane Co., Ltd., Openshaw, Manchester.—Booklet 261, describing the company's pulley blocks, &c.

Bankruptcy Proceedings.

A. J. Garrod, Whitehorse Place, Wellingborough, Northants, radio manufacturer.—The receiving order in this matter was made on March 4th on a creditor's petition. The statement of affairs shows ranking liabilities of £2,947, against assets of £466, leaving a deficiency of £2,481. The debtor attributes his failure to the calling in of borrowed capital when his experiments were in a critical stage and not quite perfect. It appears that he was formerly interested in wireless in Australia, and in May, 1924, came to England with £600 free capital. In the following September he started trading as the Unitron Valve Co. at his present address with £350 capital, and was successful until August, 1925. He borrowed £250 as he was experimenting on a wireless valve, and this was afterwards increased to £750 with a further £250 guaranteed at the bank. Later he borrowed £750 from the petitioning creditors. In November, 1926, he endeavoured to form a company to exploit his wireless valve, but he was unable to do so, and in December he closed down.

G. E. Grainger, trading as Grainger & Co., 38, Market Street, Ashby-de-la-Zouch, wireless engineer.—The first meeting of creditors was held on March 16th, at the Official Receiver's office, Nottingham. The debtor's deficiency was put at £571. He attributed his failure to bad trade, lack of business experience, loss on contracts through underestimating, and living beyond his means. He commenced business with his brother in April, 1925. They had no capital but each contributed a quantity of wireless accessories to a total value of about £40. In June of the same year, trade not being good, his brother retired and debtor continued the business. He admitted having been aware of his position shortly after he commenced business. The case was left in the hands of the Official Receiver as trustee of the estate.

E. Cowley, trading in co-partnership as George Hill & Co., 22, Chantry Lane, Great Grimsby, electrical engineer.—The application for the discharge of this debtor was heard on March 17th at the Town Hall, Great Grimsby. He was a partner in the firm of George Hill & Co. He joined the firm in November, 1920, supplying £150 capital, money loaned by his father. The partnership liabilities amounted to £652, against assets of £262. It was stated that the firm was in difficulties when debtor joined. The debtor's discharge was granted subject to a suspension for one year.

G. Mason & G. E. Tinsley (Mason & Tinsley), electrical engineers, 6, Alberta Terrace, and 94, Upper Parliament Street, Nottingham, and G. Mason (separate estate).—Last day for proofs for dividend March 30th. Trustee, Mr. L. A. West, Official Receiver, 4, Castle Place, Nottingham.

P. Ford, electrical contractor, 4a, Macdonalds Lane, Corporation Street, Manchester.—Receiving order made March 14th, on a creditor's petition.

A. Stock, electrical and radio engineer, 323, Chapel Street, Salford.—Receiving order made March 16th, on debtor's own petition.

R. A. Burnell, electrical engineer, Harefield Park, Harefield, near Uxbridge.—Trustee, Mr. T. Gourlay, Official Receiver, 29, Russell Square, W.C., released March 10th.

F. A. & R. Hartley (F. A. Hartley & Son), electrical engineers, 98, Katherine Street, Ashton-under-Lyme.—First and final dividend of 3s. 6½d. in the £, payable March 28th, at the Official Receiver's offices, Byrom Street, Manchester.

F. A. Hartley (separate estate).—First and final dividend of 20s. in the £, payable March 28th, at the Official Receiver's offices, Byrom Street, Manchester.

R. Hartley (separate estate).—First and final dividend of 20s. in the £, payable March 28th, at the Official Receiver's offices, Byrom Street, Manchester.

J. V. Figgins (V. Figgins), plumber, sanitary and electrical engineer, &c., 97, Fore Street, St. Marychurch, Torquay.—First and final dividend of 1s. 9d. in the £, payable at the Official Receiver's offices, Exeter Bank Chambers, 67, High Street, Exeter.

T. F. Collier, electrician, 116, Union Street, West, Oldham.—Receiving order made March 11th, on a creditor's petition.

R. P. Reeves (Lux Spotlight Projector Co.), electrician, 5, Say's Corner, North Quay, Great Yarmouth.—Public examination held March 23rd, at the Town Hall, Great Yarmouth.

Company Liquidations.

Gil-Ray Trading Corporation, Ltd., Sicilian House, Sicilian Avenue, W.C., radio and electrical manufacturers.—A meeting of creditors was held at the company's offices on March 14th, when Mr. S. B. Saunders, liquidator, presided. A statement of affairs was presented, which showed liabilities of £2,023 and an estimated amount available to meet the debenture holders' claim of £78. The deficiency, so far as the creditors were concerned, was £2,023. The liquidator said that there would be nothing for the unsecured creditors. The capital issued and allotted was 1,002 preference shares of £1 each, and 2,000 ordinary shares of 5s. each, so that the total deficiency as regarded contributories, was £3,525. The company was formed in July, 1925, with a cash capital of £1,000, and in May, 1926, a further £500 was put into the business, which amount was secured by a debenture. During the early part of the company's trading it did fairly well, and good orders were received for a crystal which it manufactured. Soon after, the slump in the wireless trade set in, and business became very bad. It was hoped that increasing trade would be brought about by the Manchester Exhibition, and the company had a stall there, and a great deal of time was spent on it. Things did not turn out as anticipated, however, and the exhibition authorities refused to allow the company's stock to be taken away. Consequently the debenture holder appointed a receiver. The present directors had not drawn any fees since the commencement of the company. The debenture holder was also a director of the company, and besides advancing the £500, which was secured by the debenture, he had also loaned sums from time to time without security. At the present time he stood to lose about £2,000. It was resolved that the matter should be left in the hands of the present liquidator. The following are creditors:—

	£		£
Gaskill, —	250	Auto Sundries	59
Barney, —	56	Hirst Bros.	23
Fuller's United Electric Works, Ltd.	35	Yeoman, —	63
		Johnson, A. E.	76

Evalasio Distributing Agency, Ltd., 49, Leswin Road, Stoke Newington, London, N., and Cross Street, Islington, wholesale and retail wireless dealers, &c.—A meeting of creditors was held on March 11th at the offices of Messrs. Hacker, Rubens & Co., 23, Surrey Street, W.C. The chair was occu-

pied by Mr. M. G. Hacker, liquidator in the voluntary liquidation of the company and receiver for the debenture holders. He stated that the liabilities were approximately £325 to the trade and £150 to cash creditors. The assets were apparently sufficient to fully discharge the amount due to the debenture holders, but as far as he could see, there would be no surplus available for the unsecured creditors. The company was incorporated on February 7th last to take over the business of the Evalasio Distributing Agency previously carried on by Messrs. W. H. Stevens and E. F. Keal at Stoke Newington, and that of the Edal Wireless Co., at 2, Cross Street, Islington, N. Part of the consideration for the transfer of the assets was the issue of two debentures totalling £850 to two cash creditors who had advanced money to the Evalasio Distributing Agency. The company had a nominal capital of £100 in £1 shares. No resolutions were passed, and the voluntary liquidation of the company will therefore be continued with Mr. Hacker as liquidator.

JOSEPH BOOTH & BROS., LTD., electrical engineers and crane manufacturers, Rodley, near Leeds.—A meeting of creditors was held at Leeds on March 18th. The liquidator, Mr. Alfred Walton, presided. The statement of affairs presented showed unsecured creditors for trade accounts, £9,427; unsecured loan creditors, £32,028; fully-secured creditor, £45,977 (being the bank, which held a debenture for £50,000); and preferential creditors, £3,773. The net assets were estimated at £13,233, leaving a deficiency of £28,221. Mr. Reginald Armstrong, solicitor to the company, said that Mr. Walton was appointed receiver by the debenture holders on February 21st last and as liquidator on March 2nd by the shareholders. After a number of questions had been asked and answered, it was decided to leave the matter in the hands of the liquidator, with the following as an informal committee of inspection:—Messrs. H. E. Catton (Catton & Co., Ltd., Leeds), Douglas Illingworth (Douglas Elliott & Co., Ltd.), Raymond Hartley (Clayton & Co., Ltd.), J. Blackett (Blackett, Hutton & Co., Ltd), and A. Cripwell (Corfield & Cripwell).

The liquidator pointed out that at the moment there was nothing definitely decided as to whether the business should be carried on or wound up, but in the course of the next fortnight he was seeing some people regarding the future of the company. The latter had several contracts on hand, but it was not yet quite certain that it would complete them. If there was a chance of completing the contracts profitably, it would be done. The following are creditors:—

	£		£
Blackett, Hutton & Co., Ltd.	614	*Iron and Coal Trades Review*	152
Catton & Co., Ltd. ...	208	Iron Trades Employers' Ins.	116
Clayton, Hy., Ltd. ...	333	London Elect. Wire Co. and Smiths, Ltd. ...	140
Clayton, Son & Co., Ltd.	146	Lilleshall Co., Ltd. ...	162
Chloride Electrical Storage Co., Ltd.	759	Leigh & Sullivan, Ltd.	111
Elliott, Douglas & Co., Ltd.	507	Lowrey, Weston and Whalley	131
Electro-Mech. Brake Co., Ltd.	179	Metro-Vick. Elect. Co., Ltd.	546
Engineering, Ltd. ...	114	Rotherham Forge and Rolling Mills Co., Ltd.	176
Geslett, W. D.	995	*Railway Gazette Trans.* (1910), Ltd.	112
Gordon, J., & Co. ...	105	Smith, T. & W., Ltd. ...	109
Hartley, W. Y., & Son	366		
Hanson, B. & S. ...	147		
Helme, Edwd., & Co., Ltd.	525		

AUTOVEYORS, LTD., wireless contractors, 84, Victoria Street, S.W.1.—A meeting of creditors was held on March 15th at the company's offices. The chair was occupied by Mr. E. W. Dilley, who had been appointed to act as the receiver for the debenture holders, and as the liquidator in the voluntary liquidation. The statement of affairs presented showed ranking liabilities of £18,802, including trade creditors for £9,512. The total claim of the bank was £3,494, but it held direct security of the value of £1,500 and a guarantee for a similar amount from Mr. C. Cook, to whom a charge was given on March 4th, 1924. A second bank was shown as a fully-secured creditor for £495, holding security deposited by Mr. S. H. Martin. The executors of Mr. J. Browne-Martin ranked as the cash creditors in the statement for £4,000, and interest of £156; they were also debenture holders for £2,175. The net assets were £1,318, leaving a deficiency of £17,484, so far as the creditors were concerned. The issued capital of the company consisted of 12,317 cumulative 8 per cent. participating preference shares of £1 each and 35,981 ordinary shares of 1s. each. All the issued shares were fully paid, and, as regarded the shareholders, there was a deficiency of £31,600. The company was formed in October, 1919, with a nominal capital of £100, which was immediately increased to £26,000. The company was formed to deal in motor cars, but later took up wireless. In 1922 Mr. Chapman joined the company, and conducted the wireless department; finally the whole concern was devoted to wireless. By December, 1924, the losses on the trading had increased to £10,530; in two years the company had lost approximately £7,000. About October, 1923, the directors approached the late Mr. Browne-Martin, who advanced £4,000 on the security of a debenture, of which about £2,000 had since been repaid. Since December, 1924, the company had suffered a series of reverses, but the directors had backed the concern by providing guarantees to the bank, and had used every endeavour to obtain money. Mr. P. Houstoun, of the British Traders' Association, remarked that last year a committee of the principal creditors was appointed, and it was then thought that further financial assistance would be forthcoming with a view to the business being continued. In answer to questions, the chairman stated that he had acted as the secretary of the company. In March, 1924, the company owed a substantial amount to various creditors. The largest creditors were then given bills of exchange, and all accounts were paid. The creditors were aware of the position. The representative of Standard Telephones & Cables, Ltd., the largest trade creditors, proposed a resolution that the voluntary liquidation of the company should be continued with Mr. Dilley as liquidator. This was carried, and a committee was appointed consisting of the representatives of Standard Telephones and Cables, Ltd., the Marconiphone Co., Ltd., and Metro-Vick Supplies, Ltd. The following are creditors:—

	£		£
Atkinson & Co., Ltd. ...	41	London Press Exchange, Ltd.	122
British Thomson-Houston Co., Ltd.	297	London Electric Wire Co. & Smiths, Ltd. ...	25
Burndept, Ltd.	28	Linklaters & Paines ...	96
Benjamin Electric, Ltd.	50	London Assurance Co. ...	46
B.S.A. Radio, Ltd. ...	202	Mullard Radio Valve Co., Ltd.	337
Cossor, A. C., Ltd. ...	185	Marconiphone Co., Ltd.	1,159
Carrington Mfg. Co., Ltd.	100	Metro-Vick Supplies, Ltd.	447
Celestion Radio Co. ...	151	Martin & Haslett ...	150
Cahill & Co., Ltd. ...	104	Meawser, Walter (Berlin)	410
Dubilier Condenser Co., Ltd.	41	McMichael, L., & Co., Ltd.	36
Deverell, Gibson and Hoare, Ltd.	338	Marks & Clerk	64
Ever-Ready Co. (Gt. Britain), Ltd.	266	Rothermel Radio Corporation of Great Britain, Ltd.	43
Edison Swan Electric Co., Ltd.	131	Samson-Clark & Co., Ltd.	386
Farthing, J. W.	25	Standard Telephones and Cables, Ltd. ...	1,762
Fine Stampings, Ltd. ...	57	Flack & Millward ...	160
Graham, Alfred, & Co., Ltd.	67	London Telephone Service	30
Gambrell Bros., Ltd. ...	51	Westminster Electric Supply Corporation, Ltd.	40
General Electric Co., Ltd.	216	Cook, Charles	75
Garnett, Whiteley and Co., Ltd.	23		
Hartley & Hartley ...	114		
Harrison & Jarvis ...	32		
H.S. Electric Co., Ltd.	30		
Igranic Electric Co., Ltd.	67		

DEANSGATE ELECTRO RADIO (MANCHESTER), LTD.—A petition for the winding up of this company has been presented to the County Court of Lancashire by Messrs. M. & A. Wolff, of 9-15, Whitecross Street, E.C., and will be heard in Manchester on March 30th.

ELECTRICAL STORES (NOTTINGHAM), LTD.—Particulars of claims by April 16th to the liquidator, Mr. S. H. Hill, 1, St. Peter's Church Walk, Nottingham.

CARPAX CO., LTD.—Meeting of creditors, April 4th at the Onward Hall, Onward Buildings, 207, Deansgate, Manchester. Liquidator, Mr. J. Wilson, 2, St. James's Square, Manchester.

The National Register.

The accounts of the National Register of Electrical Installation Contractors for the past year show an increase of over £350 in the receipts, while the expenditure was slightly lower. The excess of income over expenses thus rose from £319 to £708. The balance sheet shows a satisfactory financial position. The report of the Executive Committee is to be presented at the annual meeting, which is to be held at the Institution of Electrical Engineers on March 28th (2.30 p.m.).

The Czecho-Slovakian Cable Industry.

In a recent article in the *Prager Tagblatt* Herr Emil Kolben, of the well-known Kolben Co., of Prague, stated that raw materials for the electric cable industry were subject to very heavy ship and railway freights and also heavy Customs duties, being almost all obtained outside Czecho-Slovakia. This cause, together with severe internal competition, had driven a number of small cable factories out of business and rendered necessary the creation of a Czecho-Slovakian Insulation Cable Central Sales Organisation, which had been formed under the title of "Isotuba." It was hoped that this organisation would enable the member firms to turn their attention to export business, which had so far been impossible.

New French Companies.

La Société Meridionale d'Energie Electrique is the name of a company which has lately been formed in Paris (4, Rue Sainte Anne) with a capital of 1¼ million francs, to establish electricity supply systems in the Midi and south-west districts of France.

Under the auspices of the French Thomson-Houston Co. a new concern has been formed in Paris with a small nominal capital and the title Société d'Usinage des Tubes pour l'Electricité.

Social Events.

The annual dinner of the Willesden Electricity Department was held at the Social Clubroom, Salusbury Road, on March 12th. The chief engineer (Mr. A. W. Blake) presided, supported by Councillor W. A. Hill (chairman) and other members of the Electricity Committee. An excellent musical programme provided by members of the staff followed the dinner. During the evening Mr. Blake presented a silver challenge cup to a team representing the sub-stations staff who had secured the highest number of points in a series of games competitions between the various departments.

On March 18th the annual dinner of the staff of Messrs. Watson & Sons (Electro-Medical), Ltd., was held at Pagani's Restaurant, W. After an excellent *menu* and the loyal toast Mr. C. H. Watson proposed the health of the chairman (Mr. M. J. Railing), and, in responding, Mr. Railing said that the company had come through the troubles of the past year in a highly satisfactory manner. He warned his audience, however, that the way was not yet clear and there was a need for hard work and a thorough understanding of his job by every individual. A concert followed, given by the "Harrovians," under the leadership of Mr. J. W. Haynes.

The annual staff dinner of Messrs. Ferranti, Ltd., was held on March 18th at the Midland Hotel, Manchester. The chair was occupied by Dr. S. Z. de Ferranti in the absence, through illness, of the chairman of the company, Mr. A. W. Tait. In a speech, Dr. Ferranti emphasised the need for reducing costs of production to enable British manufacturers to compete with the foreigner and so reap the full benefit of the increased demand for electrical products which was anticipated. Mr. Arthur Ellis, in proposing the toast of the company, referred to the large extensions nearing completion at Hollinwood and to Dr. Ferranti's keen interest in every department. He congratulated Dr. Ferranti on the honour about to be conferred on him. Mr. Vincent de Ferranti responded on behalf of the company. Mr. R. W. Cooper, a director of the company, proposed "Our Guests," on whose behalf Mr. W. Chamberlain responded. The toast, "The Chairman," was proposed by Sir B. Longbottom. Dancing and musical items followed.

For Sale.

Rotherham Corporation Electric Supply Department has for disposal 300 second-hand d.c. meters. The City of Bristol Health Department has for disposal a generating set, switchboard, storage battery, &c. Bedford Electricity Department invites offers for a 1,000-kW turbo-alternator set, with condenser, pumps, &c. Belfast Corporation Electricity Department invites offers for one Babcock & Wilcox water-tube boiler. Rushden and District Electric Supply Co., Ltd., has for disposal three surplus generating sets, &c. Wellingborough Electric Supply Co., Ltd., invites offers for surplus steam dynamos, Babcock boilers, chain grate boilers, condensers, &c. Shell-Mex, Ltd., has for disposal surplus generating plant now running at Shell Haven. Yorkshire (West Riding) Electric Tramways Co., Ltd., invites offers for two 320-h.p. Diesel engines, coupled to two Dick, Kerr generators, &c., booster, and travelling crane. (See our advertisement pages to-day.)

Book Notices.

To those concerned with railway electrification, a publication under the above heading, by Mr. R. H. Wright, of the Association of Engineering and Shipbuilding Draughtsmen (price 2s.), should prove of interest. It is a general consideration of the main problems involved in power distribution, transformation, and control for railway electrification. The progress made, both at home and abroad, to the present time is outlined, and the author speculates on the likely developments of the immediate future.

"The Anglo-American Year Book" (pp. 490). The American Chamber of Commerce in London. Price 15s. net.—The latest edition of this directory and guide retains the features which have made it so useful in previous years. Of particular interest is the section including the names, &c., of 7,000 companies engaged in Anglo-American trade.

"Radio for the Million." Vol. 1, No. 2. Pp. 48, illustrated. London: Mullard Wireless Service Co., Ltd. Price 1s.—This quarterly publication includes blue prints and diagrams and other useful information in article form. Copies are obtainable, free of charge, from the Editor, 63, Lincoln's Inn Fields, or by filling in a coupon obtainable from local dealers.

"The *Transactions* of the South African Institute of Electrical Engineers." Vol. XVIII, Part I. January, 1927. Price 2s.—In this issue are given the proceedings of the annual general meeting of the Institute, held at Johannesburg on January 27th this year. The valedictory address of the retiring president, Mr. V. Pickles, took the form of a review of the Rand Power Co.'s experiences from the year 1923 up to May, 1926, when the Witbank generating station was put in commission.

Standard Telephones & Cables, Ltd., has sent us a copy of a brochure produced for the occasion of the visit to the company's Hendon factory of the Prime Minister of New Zealand (Mr. J. G. Coates). This publication illustrates and describes the 5-kW broadcasting apparatus which the company has made for Wellington, N.Z.

"The *Journal* of the South African Institution of Engineers." Vol. XXV, No. 7, February, 1927. Price 2s.

"The North American Company" (pp. 58, ill.). New York: The Company.—This is a handsome brochure describing the growth of the company's subsidiaries since its incorporation in 1890. These companies serve about 900,000 consumers over large areas of the United States, and have a combined capital of about $70,000,000.

The Hart Accumulator Co., Ltd., has produced a "Nearest Garage Guide" for London. This contains the addresses, telephone numbers, &c., of theatres, music halls, hotels, restaurants, public places of interest, &c., in London, and by a system of references indicates the nearest garage and gives particulars of the facilities available thereat.

"Constructive Suggestions." Pp. 38; figs. 28. London: British Thomson-Houston Co., Ltd.—This booklet, No. A.G. 220, contains very full instructions for the home construction of "Resistor" 2, 3, 4, and 5-valve sets and amplifiers, utilising the new B.T.-H. resistance-capacity type B.8 valve. Complete detailed wiring diagrams, panel-drilling dimensions, and lists of components required, are included.

"*Journal* of the Institution of Electrical Engineers." Vol. LXV. March, 1927. London: The Institution. Price 10s. 6d.

"Technologic Papers of the U.S.A. Bureau of Standards." Vol. 21, No. 330. Resistance of conductors of various types and sizes as windings of single-layer coils at 150 to 6,000 kilocycles (5 cents).

"The *Journal* of the Royal Technical College, Glasgow," No. 3, contains articles recording the results of some of the research work carried out by the staff and senior students. Amongst these are some investigations in electrolysis and photoelectricity, combustion, and losses in nozzles. The journal contains 180 pages, and is admirably produced.

Prices of Raw Materials.

The following prices are only general, and they may vary according to quantities and other circumstances:—

	CHEMICALS, &c.		Price Mar. 22nd.	Fortnight's inc. or dec.
a	Acid, Oxalic	per lb.	6¾d.	...
a	Ammoniac, Sal	per ton.	£60	...
a	Ammonia, Muriate (large crystal)	,,	£52	...
a	Bisulphide of Carbon	,,	...	...
a	Borax	,,	£35	...
a	Copper Sulphate	,,	£25 10s.	...
a	Potash, Chlorate	per lb.	4d. to 4½d.	...
a	,, Perchlorate	,,	5½d.	...
a	Shellac	per cwt.	£13 10s.	...
a	Sulphur, Commercial	,,	£9 10s.	...
a	,, Roll	,,	£9 10s.	...
a	Soda, Chlorate	per lb.	3½d. to 8½d.	...
a	,, Crystals	per ton.	£5 to £5 5s.	...
a	Sodium Bichromate, casks ...	per lb.	4d.	...
	METALS, &c.			
b	Aluminium, Ingots...	per ton.	£107 to £113	...
b	,, Wire	per lb.	1/6 to 2/-	...
b	,, Sheet	,,	1/8 to 2/9	...
p	Babbitt's Metal and Anti-friction Metal—			
	Grade I	per ton net.	£274	...
	Grade II	,, ,,	£190	...
	Grade III...	,, ,,	£98	...
c	Brass (rolled metal 2" to 12" basis)	per lb.	9½d.	...
c	,, Tubes (solid drawn) ...	,,	11½d. to 11¾d.	...
c	,, Wire, basis	,,	9½d.	...
c	Copper Tubes (solid drawn) ...	,,	1/0½	...
c	,, Bars (best selected) ...	per ton.	£86	...
c	,, Sheet	,,	£86	...
c	,, Rod	,,	£86	...
d	,, (Electrolytic) Bars ...	,,	£63 2s. 6d.	...
d	,, ,, Sheets ...	,,	£145 10s.	...
d	,, ,, Wire Rods	,,	£73 2s. 6d.	...
d	,, ,, H.C. Wire	per lb.	9½d.	...
f	Ebonite Rod	,,	2/3 to 2/6	...
f	,, Sheet	,,	2/3 to 2/6	...
a	German Silver Wire	,,	2/2	...
h	Gutta-percha, fine	,,	8/-	...
h	India-rubber, Para fine	,,	1/5½	½d. dec.
i	Iron Pig (Cleveland No. 3.) ...	per ton.	122/6	...
i	,, Wire, galv. No. 8, P.O. qual.	,,	£21	...
g	Lead, English pig	,,	£29 15s.	...
g	Mercury	per bot.	£20 10s.	£2 10s. to £2 15s. inc.
e	Mica (in original cases) small ...	per lb.	3d. to 8/-	...
e	,, ,, medium	,,	4/- to 8/-	...
e	,, ,, large ...	,,	10/ to 20/- & up.	...
p	Phosphor Bronze, plain castings	,,	1/3½	...
p	,, ,, drawn bars & rods	,,	1/3	...
p	,, ,, rolled strip & sheet	,,	1/2½	...
p	,, ,, wire...	,,	1/3½	...
o	Platinum	per oz.	£28	...
d	Silicium Bronze Wire	per lb.	10¾d.	...
r	Steel, Magnet, in bars	,,	7½d.	...
n	Tin, Block (English)	per ton.	£312 10s. to £313 10s.	£2 10s. inc.
n	,, Wire, Nos. 1 to 16	per lb.	4/9	...

*For 1 cwt. lots. Special quotations against definite specifications.

Quotations supplied by

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd
g James & Shakespeare.
h Edward Hill & Co.
i Bolling & Lowe.
l Richard Johnson & Nephew, Ltd.
n P. Ormiston & Sons.
o Johnson, Matthey & Co., Ltd.
p C. Clifford & Son, Ltd.
r W. F. Dennis & Co.

In their weekly report, dated March 19th, Messrs. James Forster & Co. stated:—"The lead market will probably continue to sag until a fresh wave of buying by consumers develops, when a sharp recovery from present values should be seen. The Board of Trade returns for February, 1927 (including manufactured lead) were:—Imports, 30,137 tons; exports, 1,660 tons; leaving for home absorption, 28,477 tons."

Lighting and Power Notes.

Bradford.—NEW TRANSFORMER STATION.—The Electricity Committee is to provide a district transformer station in the Haworth Road district at a cost of £5,000.

Brighton.—INQUIRY.—An inquiry was held at the Town Hall on March 15th and 16th by Col. T. C. Ekin into the application of the Peacehaven Electric Light and Power Co., Ltd., for a Special Order authorising it to supply electricity in the parish of Telscombe and part of the parish of Piddinghoe. The application was opposed by the Newhaven Rural District Council, the East Sussex County Council, and the Peacehaven Ratepayers' Association.

Bromley (Kent).—TRANSFER OF UNDERTAKING.—The Town Council has arranged to purchase the undertaking of the Bromley (Kent) Electric Light and Power Co., Ltd., for £135,000 under the terms of the option without resorting to arbitration. Pending the transfer, the Council has given its approval to extensions of mains at an estimated cost of £5,124.

Bury St. Edmunds.—NEW PLANT.—The borough electrical engineer, Mr. S. E. Day, has submitted a recommendation to the Town Council to increase the plant at the electricity works at an estimated cost of £15,000. The matter has been referred to the Electricity Committee for consideration.

Canada.—ONTARIO.—A report has been issued by the Ontario Department of Mines giving details of hydro-electric development for the supply of power to the metallic mines of Northern Ontario. The first installation was made in 1905, and the development during the past 20 years has been at the average rate 6,636 h.p. a year. The Northern Canada Power Company has at present a surplus of about 10,000 h.p., but this will shortly be absorbed by extensive mining operations in the Rouyn mining district of Quebec. The twelve power systems of Northern Ontario have an aggregate capacity of 131,170 h.p. The total amount of power now used in mining is 83,000 h.p., of which the gold mines take 46,350 h.p., nickel and copper mines 28,850 h.p., and silver mines 7,800 h.p.

Cleethorpes.—ELECTRICITY SUPPLY.—At a recent meeting of the Urban District Council it was reported that the Electricity Commissioners were prepared to sanction the raising of a loan for buildings, cables, &c., in connection with the electricity scheme for the district as soon as the agreement between the Council and Grimsby Corporation had been approved by them.

Continental.—GERMANY.—The Association of Electricity Works of Berlin has issued a statement showing that the output of the 388 generating stations in Germany in 1925 was 12,000,000,000 kWh, of which 61 per cent. was produced by the 24 largest works, each of which is responsible for over 100 million kWh per annum.

The Waggon und Maschinenbau Gesellschaft, of Corlitz, has recently completed a 22,000/27,000-kW turbine running at 3,000 r.p.m. at a vacuum of 96 per cent. A feature of the machine is the division of the low-pressure portion into four separate compartments within a single casing. The company is at present constructing a high-speed turbine of a capacity of from 30,000 to 33,000 kW with a 95 per cent. vacuum at the exhaust steam outlet.

ITALY.—Work has commenced on the construction of a large new hydro-electric station at Cardano, which, it is claimed, will be the largest of its kind in Europe. The plant, which will have an annual output of 500 million kWh, will utilise the water of the River Isarco, which will be conveyed to the station by means of a tunnel 10 miles in length, the available head being about 570 ft. Five sets of 50,000-h.p. turbo-generators are to be installed for the supply of power to the provinces of Lombardy, Veneto and Piemonte, and three sets each of 10,000 h.p. to furnish the power for the electrification of the Bolzano-Brenner railway.

SWITZERLAND.—The municipal central electricity station at Lugano is to be extended by the addition of a new 3,000-h.p. Diesel engine in order to meet the increasing demand for electricity in the district. The contract for the new engine has been placed with Gebruder Sulzer, of Winterthur, who constructed the existing 2,300-h.p. engine at the Lugano station.

Glasgow.—PROGRESS DURING FEBRUARY.—The Corporation electricity manager states that under the Department's scheme 116 houses were wired in February, making the total to date 3,352. Agreements under the 10 years' hire-purchase scheme numbered 72. The number of applications for the hire of appliances was 296, making the total to date 14,575.

Gravesend.—PROPOSED CHANGE-OVER.—The Corporation has applied for consent to change over its system of electricity supply from d.c., 3-wire, 460 and 230 V, to a.c., 3-phase, 50 cycles, 4-wire, 400 and 230 V.

Grimsby.—EXTENSION OF SUPPLY.—The borough electrical engineer (Col. W. A. Vignoles) has submitted a report to the Electricity Committee on the provision of an electricity supply to the Cleethorpes Council. He recommends the laying of a cable from Ribly Street sub-station to Park Street, and one from the power station to Car Lane. These would be joined by two similar cables to be laid by the Cleethorpes Council in its area. A sub-station at Old Clee is also proposed, the estimated cost of the whole scheme being £10,200.

Hawarden.—ELECTRICITY EXTENSIONS.—The Rural District Council has under consideration a scheme for extending its area of electricity supply so as to include Ewloe, Aston Broughton, Bretton, Penyffordd, and Sealand, at an estimated cost of £28,675, and application is to be made for sanction to a loan for this purpose.

Hull.—ELECTRICITY SUPPLY.—The Corporation has received inquiries from Withernsea and Hornsea regarding an electricity supply for these areas, and has replied suggesting that the authorities should communicate with the Central Electricity Board, asking if it would be prepared to sanction the necessary transmission line.

India.—SALSETTE (BOMBAY).—The electrification of Salsette, which was first proposed in 1916, has now been approved by the Government of Bombay. According to *Indian Engineering* arrangements have been completed with the Andhra Valley Power Supply Co., Ltd., to purchase electricity in bulk at Dharavi receiving station, whence it will be conveyed by a h.p. underground cable to Bandra for distribution and thence to Santa Cruz *via* Khar in the first instance. The area of supply granted under the licence includes, in addition to the above centres, the townships of Ville Parle, Juhu, Varsova, Andheri, the Military Cantonment of Wakola, Kurla, Ghatkopar, Vikhroli, and the whole of the island of Trombay. Energy will probably be available at Bandra, Khar and as far north as Santa Cruz before the conclusion of the current year. The work of construction is to begin before next monsoon.

Japan.—ELECTRICAL DEVELOPMENT.—Work on the construction of a steam power station at Tsurumi by the Tokyo Electric Light Co. will commence shortly. The station will have a capacity of 70,000 kW, and the cost is estimated at 15,000,000 yen.

The Imperial Government Railways are erecting a power station at Shinano-gawa, at a total estimated cost of 79,210,000 yen, of which 62,600,000 yen will be for the station building and plant, 11,100,000 yen for transmission line, and 5,400,000 yen for sub-station building and plant. The first section of the scheme is to be completed in 1932, and the second section in 1935.

Llanfairfechan.—ELECTRICITY SCHEME.—The Urban District Council has adopted an electricity scheme prepared by Mr. Price F. White, of Bangor. It is proposed that a bulk supply of electricity shall be obtained from the North Wales Power Co. The total cost of the scheme is estimated at £11,700.

London.—SHOREDITCH.—The Electricity Committee has decided to extend mains at a cost of £9,534, to lay services to consumers' premises at a cost of £3,600, and purchase prepayment meters at a cost of £4,600.

ISLINGTON.—The Electricity Committee has received sanction to the borrowing of £22,000 for mains, services, transformers, and meters.

Lowestoft.—LOANS.—The Electricity Committee has recommended to the Town Council that application be made for sanction to loans totalling £20,800 made up as follows:—Mains, £3,000; meters, £2,000; services, £5,000; feeder cables, £10,800.

Middlesbrough.—ELECTRICITY SCHEME REJECTED.—The Electricity Commissioners have rejected the Corporation's application for sanction to erect a power station instead of purchasing a supply from a power company. The Corporation asked for sanction to borrow £141,346. According to the *Manchester Guardian*, the Commissioners state that they are not satisfied that the Corporation would be in the position to give a supply of electricity adequate in quantity and regularity to meet the present and prospective demands of its consumers at a cost not greater than that at which it could give a supply if it obtained a supply of electricity from the Cleveland and Durham County Electric Power Co., and express the opinion that the price of the bulk supply should be fixed at £2 7s. per kW per annum, and 0.3d. per kWh, on conditions set out in a letter, for a reasonable term of years with provision for quinquennial revision, and ask the Corporation to endeavour to agree with the Power Company the appropriate terms and conditions under which the arrangement is to be made. If the parties are unable to agree upon the terms they will fall to be settled by the Commissioners.

Northern Ireland.—WARRENPOINT (CO. DOWN).—The Urban District Council is inviting tenders for the electric lighting of the town.

Price Reductions.—Reductions in the charges for electricity have been made or recommended in the following districts:—

HASTINGS.—The increase of 12½ per cent., made owing to the coal strike, has been removed.

ISLE OF WIGHT.—*Isle of Wight Electric Light and Power Co., Ltd.*—The temporary increase of ¼d. per kWh is withdrawn.

Slaithwaite.—LOAN SANCTIONED.—The Urban District Council has received sanction to the borrowing of £6,250 for mains and services, and £1,000 for meters.

Special Orders.—Applications have been made to the Electricity Commissioners for Special Orders by the following authorities:—The Bourton-on-the-Water Electric Light and Power Co., Ltd., authorising it to supply electricity in the

parish of Bourton; the Leicestershire and Warwickshire Electric Power Co., for the supply of electricity in the rural district of Castle Donington, and parts of the rural districts of Ashby-de-la-Zouch, Loughborough, and Shardlow; the King's Lynn Corporation, to extend its area of electricity supply so as to include certain parishes in the rural districts of Freebridge Lynn and King's Lynn; and the Northampton Electric Light and Power Co., Ltd., to supply in the boroughs of Brackley and Buckingham, the rural districts of Crick, Middleton, Cheney, Brackley, Buckingham, and Winslow, and certain parishes in the rural districts of Daventry, Brixworth, Oxenden, Towcester, and Ampthill.

Tarvin.—ELECTRICITY SUPPLY.—The Electricity Commissioners have decided to grant the application of the Chester Corporation to supply electricity in the district and not to proceed further with the application by the Gwynedd Trust.

United States.—ELECTRICAL DEVELOPMENT.—A large hydro-electric scheme on the Saluda River, ten miles west of Columbia, South Carolina, has been undertaken by the General Gas & Electric Corporation, involving an initial expenditure of $20,000,000. The annual output of the plant is expected to exceed 300,000,000 kWh.—*Reuter's Trade Service* (New York).

According to the *Electrical World*, the Standard Gas & Electric Co. is to carry out developments during 1927 at a cost of $61,500,000. The programme includes the extension of the Colfax steam generating station from 190,000 kW to 270,000 kW, and the erection of a hydro-electric power station on the Rouge River, which will have an initial capacity of 15,000 kW and an ultimate capacity of 45,000 kW. This station is expected to be in operation by October next.

The West Virginia Power & Transmission Co. has applied for a licence for the erection of a power station on the Cheat River and tributaries in West Virginia and Pennsylvania. A number of dams are to be constructed, and the scheme provides for the development of 238,000 h.p.

Wellington (Somerset).—ELECTRICITY SUPPLY.—The Rural District Council has decided to give its consent to an application by Dr. J. A. Purves, on behalf of the Dulverton Electric Light Co., Ltd., for a Special Order to supply electricity within the Council's area. The supply will be by means of overhead cables.

West Cornwall.—ELECTRICITY SCHEME.—Plans prepared by the West Cornwall Electric Supply Co., in connection with works in areas for which it is applying for a Special Order were laid before the West Penwith Rural District Council at Penzance on March 10th. It was intimated that the maximum charge which the company proposed to make was 1s. per kWh for a specified minimum number of units. Some objection was raised to the powers proposed to be conferred under the Order for the erection of overhead cables, and it was mentioned that Hayle Urban District Council had also objected to the use of overhead cables on the ground of their unsightliness. The whole matter was referred to a committee.

Whitby.—CORRECTION.—We are informed that reductions in the electricity charges announced in our last issue are incorrect, the following scale is now in operation:—Lighting: 7d. per kWh. Heating and domestic rate: 1½d. per kWh. Power: First 500 kWh, 3d. per kWh; remainder, 2d. per kWh.

York.—LOAN SANCTIONED.—The Electricity Committee has received sanction to the borrowing of £3,000 for the purchase of transformers.

Tramway and Railway Notes.

Bradford.—FARES.—Following the rejection by the Tramways Committee of a scheme to raise 1½d. tramway fares to 2d. and to reduce long-distance fares to a maximum of 3d., the Committee has now introduced for consideration by the City Council another scheme, involving the increase of the 1d. fares to 1½d., 1½d. fares to 2d., the maximum fare to be reduced to 2d., with the issue of weekly passes at 2s. and 2s. 6d. The city treasurer states that, based on the number of passengers carried last year, the proposed revision would yield a net increase of £10,000 in receipts. At a subsequent meeting of the Corporation a compromise was agreed upon. The penny stages are retained (though some may be shortened), the 1½d. fares will be increased to 2d., and 2d. will be the maximum fare. The longest route is 6½ miles, the present fare for which is 6d. Weekly passes will also be issued.

Burnley.—TRANSPORT FINANCE.—At a meeting of the Town Council on March 16th, the chairman of the Finance Committee expressed dissatisfaction with the position of the transport services. They showed a loss on certain routes, which was serious, and must have a crippling effect. Instead of the surplus on the Tramways and Omnibuses Department for the current year being £18,553, it would only reach £12,027. While giving every latitude to omnibuses as a new venture, the Committee would, if the loss continued, have to consider cutting down services.

Continental.—GERMANY.—The Ruhr Settlement Union has allocated a sum of 2,000 marks for the formation of an investigation company for the construction of high-speed railways. The question concerns a type of railway somewhat similar to the Langen suspended system which is in use at Elberfeld, although the speed is put at a possible rate of 150 m.p.h.

Dearne Valley.—TRAMCARS *v.* 'BUSES.—According to the *Electric Railway and Tramway Journal*, notices were recently exhibited announcing a fresh scale of fares on the Dearne District Light Railway. Drastic reductions have been made. The fare from Barnsley to Thurnscoe has been reduced from 10d. to 3d. Similar concessions have been made throughout the system, and passengers will be able to travel the whole length of the route, which is about 10 miles, for 3d. The fare from Wombwell to Barnsley has been reduced from 5d. to 2d. The immediate result was the swamping of the cars by passengers anxious to avail themselves of the cheap rate of travel, but the initial enthusiasm of the people for the tramways has now been countered by the Barnsley and District Traction Co., Ltd., reducing its 'bus fares to similar figures.

Gravesend.—INQUIRY.—An inquiry was held by the Ministry of Transport on March 15th into the application of the Gravesend and Northfleet Electric Tramways, Ltd., for an Order authorising it to abandon its tramway and to substitute omnibuses or other passenger-carrying vehicles. For the company it was stated that 'bus competition had materially affected receipts, and in 1926 the company's income was £20,000, against which working expenditure of £20,332 had to be met. The tramway track was worn, and the cost of reconstruction was estimated at £165,000, a figure which the company was unable to face. It was not proposed to remove the track, but that at the end of a certain period the material should vest in the Road Authority. The value of the track would compensate the local authority for taking up the lines. For the Northfleet Council it was proposed that after notice of abandonment had been given by the company, it should pay to the Road Authority such sum as might be agreed to cover the cost of taking up the track and reconstructing the road. In any case the company should remove the poles and wires. The Town Clerk said that the Gravesend Corporation was of the same opinion as Northfleet, and he also suggested that the Corporation should be compensated for loss of profit in respect of its electricity undertaking, which supplied power for the tramway undertaking. The Ministry will give its decision in due course.

Irish Free State.—DUBLIN.—The Dublin United Tramways Co. is taking over the disused Dublin-Lucan tramway line, and is to reconstruct it at an approximate cost of £80,000. The track will be laid above the road surface. The company will also provide an electricity supply for the whole district from Dublin to Lucan.

Japan.—UNDERGROUND RAILWAY.—It is reported that Messrs. N. Kaneko and G. Takikawa propose to form the Kobe Underground Railway Co., Ltd., with a capital of 20,000,000 yen, for the construction of an underground railway from Sumiyoshi to Suma and from Wakinohama to Suma, both lines passing through Kobe, the total length being 18 miles. The estimated cost of the scheme is 60,000,000 yen.

RAILWAY ELECTRIFICATION.—The Matsuzaka railway between Matsuzaka-machi and Oishi-mura, Miye-ken, a distance of 12 miles, is being electrified at a cost of 300,000 yen.

NEW TRAMWAY.—An application for permission to construct an electric tramway between Koriyama and Yumoto-machi, Fukushima-ken, has received official sanction. The line will be 23 miles in length, and the cost is estimated at 2,145,500 yen.

Worcester.—PURCHASE OF TRAMWAYS.—The City Council has adopted a recommendation of the Traffic Committee to purchase the privately-owned tramways in the city at a cost of £75,000. It is proposed to remove the tramway track and enter into an agreement with the Midland Red Omnibus Co for a 'bus service in the district.

Telegraph and Telephone Notes.

Canada.—EDMONTON AUTOMATIC TELEPHONE EXCHANGE.—A new automatic telephone exchange has recently been brought into use at Edmonton, Canada, to serve the south district. It was manufactured and installed by Siemens Bros. & Co., Ltd., Woolwich, and is the No. 16 system with an initial equipment of 2,300 lines and ultimate capacity for 5,500. It supersedes an old 3-wire system with push-button ringing, and is the first portion of the scheme in hand to provide Edmonton with a modern fully-automatic system of 100,000 lines.

Hungary.—LONG-DISTANCE TELEPHONE COMMUNICATION.—The laying of a direct telephone cable joining Budapest with Vienna, Frankfort, Munich, and other German towns is

nearly finished. The development of the Hungarian telephone system is making great progress, and in about three years all towns and many villages in Hungary will be connected by telephone.—*Reuter's Trade Service* (Budapest).

Japan.—STORM DAMAGE.—The recent earthquake damage is officially regarded as surprisingly low. A snowstorm interrupted communication throughout the country on March 13th and 14th and put out of commission in Tokyo alone 13,000 telephones, and a public outcry will probably result, says the *Financial Times*, as there is complaint of the inadequacy and inefficiency of the system. The Bonin cable was also broken, and cable communication between London and places in Japan beyond Nagasaki was interrupted recently. Both the Great Northern Telegraph Co.'s and the Great Eastern Telegraph Co., Ltd., services were affected.

Long-distance Radio Communication.—NEW ZEALAND-SOUTH AFRICA.—Soon after dawn on March 18th New Zealand and South Africa were in direct communication for the first time, when a speaker at the Shag Valley station conversed by Morse signals for over an hour with an operator at Caledon, in the Orange Free State Province. Communication was fairly easy, although little power was used at the New Zealand end. New Zealand amateurs have been trying for years to get into touch with South Africa, but hitherto without success.—*Reuter* (Wellington).

Pacific Cable Board.—RECONSTITUTION.—A Bill introduced in the House of Commons provides that the Pacific Cable Board is in future to consist of seven members—two representatives of the United Kingdom, two of Canada, two of Australia, and one of New Zealand, with a chairman appointed by the Board and agreed on by the Governments, who may or may not be one of the members. The chairman is to receive a salary of £1,000 a year, plus travelling expenses (or more, if the Governments so agree) unless he holds an office of profit under the Crown, and every other member of the Board not holding such office of profit will be paid £300 a year. The Bill consolidates the Pacific Cable Acts of 1901 and 1924, and provides for the disposal of receipts and surpluses and for the application of the reserve fund. It empowers the Board, subject to the approval of the partner Governments, to undertake as agent for and at the expense of the Governments of any parts of his Majesty's Dominions any work in connection with telegraph communication, whether by means of cables or wireless telegraphy, within the sphere of its operations or within the Caribbean area.

Siam.—NEW RADIO STATION.—The German Telefunken Co. has obtained the contract for the new wireless station at Bangkok. The three stations which have existed for a number of years have not been capable of transmitting messages effectively to Europe, and it was decided to have a station for short-wave, duplex, high-speed working between Siam and Europe. Tenders were obtained from the leading companies: the Marconi Company quoted £66,153 for the "beam" system and £29,163 for a system of omni-directional communication; the prices, however, were not inclusive. The Compagnie Générale de T.S.F. wanted 213,785 gold dollars, plus 20,000 ticals, plus Customs duty and landing charges; the Telefunken Co. quoted £25,000, which included everything, and secured the contract.—*Reuter* (Bangkok).

Spain.—MADRID-ARGENTINA WIRELESS SERVICE.—In the course of a Cabinet Council on March 16th a Bill was considered authorising a private company to install a short-wave wireless station to connect Madrid directly with the Argentine. Three conditions, however, are attached to the authorisation: (1) That the service must not be exclusively between these two countries; (2) the company must not have a monopoly; and (3) it must not receive State aid. The Bill will now be handed to the Minister of the Interior for examination by technical experts.—*Reuter* (Madrid).

The Telephone Service.—NEW ANGLO-FRENCH CABLE.—The rapid development of long-distance telephony has necessitated the provision of new routes of communication, and facilities for trans-continental telephone traffic were increased by the laying on March 16th of a new cable in the English Channel. It is of the paper-insulated lead-covered type, and has the advantage of low electrostatic capacity and leakance, which are characteristics very favourable for efficient speech transmission. The cable is 23¼ nautical miles in length, is about 2.6 in. in overall diameter, and weighs 623 tons; it was laid in one length (obviating the necessity of making a joint at sea) between Sandgate, on the English side, and Audresselles, on the French coast. This is the third cable of its kind to be laid by Messrs. Siemens Bros. & Co., Ltd., the previous ones carried out by the company being the Anglo-Dutch cable of 1924, and the Anglo-Belgian cable laid last year.

YEAR'S PROGRESS.—Post Office statistics show that during 1926 119,092 new telephones were installed in Great Britain and Northern Ireland, bringing the total number in use up to 1,477,000. Of the new installations, 41,596 were in private residences, bringing this total to 291,700; the share of the provincial exchanges in this number was 181,530. There were 21,493 call boxes in use at the end of the year; street kiosks with telephones numbered 2,716; of the total number of call boxes, the provinces had 16,807 and London 4,686. The number of new rural exchanges opened was 196, bringing the total to 991. Party-line stations in rural areas numbered 9,958, the year's increase being 204; rural railway stations "on the 'phone" numbered 721, of which 47 were added during the year. During 1926 there were 73,00,000 more calls than in 1925, the grand total of calls for 1926 having been 1,072 million.

West Indian Islands.—TELEGRAPHY.—The report of the Pacific Cable Board for the year ended March 31st, 1926, on the working of the submarine cables and wireless telegraph stations in the West Indian Islands and British Guiana shows that the excess of receipts over expenditure was £6,010, the latter amounting to £39,173. A sum of £21,309 was paid to the National Debt Commissioners during the year in respect of interest on, and repayment of, advances by way of capital for laying and equipping the system; £6,010 (surplus receipts) was available towards meeting this annuity, and the deficiency to be made good by the contributing Governments will therefore be £15,299 for the year under review. Prior to the establishment of the Government system, a subsidy amounting to £26,300 was paid annually to the West India and Panama Telegraph Co., which lapsed in September, 1924, and it is gratifying to the Board that the operations for the first complete year have resulted, even after the payment for amortisation of capital, in the deficiency falling short by £11,000 of the subsidy previously paid. During the year under review no interruptions occurred to the cables and none of the wireless stations was out of commission. The local organisation work was carried out by Mr. W. E. Rockingham (one of the Board's superintendents attached to the Pacific cable system), assisted by Mr. R. G. McLachlan and four other officers who were transferred to the West Indies temporarily, but Mr. R. G. McLachlan has since been permanently appointed to the West Indian system; the work presented many real difficulties. The news service, which is supplied free to the West Indies by the Board, has been improved, and there has been a substantial growth in the traffic since the Board's service commenced.

Radio Notes.

Australia.—NEW STATION.—3DB Broadcasting Co. Pty., Ltd., has been registered at Melbourne, with a capital of £20,000 in £1 shares, for the purpose of opening a "B"-class broadcasting station, to operate from Capitol House, Melbourne, and Amalgamated Wireless (Australasia), Ltd., is equipping a transmitting room on the roof. Two lattice steel towers, 45 ft. high, will be erected on the roof to carry the aerials. The initial power output will be 500 watts and the wave-length 255 metres. Revenue will be derived from advertising, no fees from listeners being allotted to "B"-class stations.

Austria.—VISITORS' FEES.—Foreign visitors to Austria whose stay does not exceed three months, and who have with them receiving sets, are not required to pay the usual licence fee of 2s. per month, but a special fee of only 1s. per month. An application form can be secured at any post office, and, on entry into the country, foreigners must deposit a given sum for customs purposes to cover the set, which is reimbursed on leaving the country.

Holland.—SHORT-WAVE TELEPHONY.—Twice within the past few days has telephone communication been established between Holland and the Dutch East Indies. This achievement, it is claimed, constitutes a world's record for long-distance wireless telephony. A musical concert given in Eindhoven was clearly heard by a Bandoeng wireless amateur, and a telegram was received from Dr. de Groot, the head of the Dutch East Indian telephone and telegraph service, declaring that reception on the 30.92-metre wave was excellent, two speeches having been quite distinctly heard at the Government wireless receiving station in Java. As there is at present no wireless telephone transmitting apparatus in Java, the acknowledgments were by ordinary cable, or wireless-telegraphy. The transmitting installation was constructed by Dr. Balthasar van der Pol, the head of the wireless investigation department of Messrs. Philips, of Eindhoven, and Mr. Numans, and was designed for experimental purposes, the Philips' Company having been granted a special licence for this object. The regulation of the frequency is by a vibrating quartz crystal; a valve amplifier and water-cooled Philips transmitting valves are used, and the antenna consists of a single wire attached to a pole only 22 ft. from the ground. An attempt is shortly to be made to secure similar contact with the West Indies.—*Reuter* (Amsterdam).

Sweden.—NEW HIGH-POWER STATION.—The new station in Motala, in the centre of Sweden, is expected to begin test transmission towards the end of March, having a power of not less than 30 kW; it is of the same type as Daventry, says *World Radio*, and when opened the Karlsborg station will revert to its real purpose as a wireless-telegraph station, its broadcasting wave (1,305 metres) being taken over by Motala.

LICENCES.—The number of licence-holders has increased to about 260,000, thus placing Sweden next to England with regard to the percentage of licensees to the population.

Contract Information.

When "Contracts Open" are advertised in our "Official Notice" pages, the date of the ELECTRICAL REVIEW containing the advertisement is given in parentheses below.

Contracts Open.

Australia.—MELBOURNE.—May 10th. Postmaster-General's Department. Telephone relays. (B.X. 3333.)*

May 17. Resistances and reactances. (B.X. 3307.)*

May 23rd. State Electricity Commission. Switchgear and accessories. (B.X. 3285.)*

May 9th. 6,600-V transformers and spares. (B.X. 3331.)*

SYDNEY.—May 9th. Electricity Department. Station auxiliary switchgear. (B.X. 3338.)*

Beckenham.—April 4th. Electricity Department. Three e.h.p. transformer sub-station switchboards. (March 18th.)

Bristol.—April 11th. Electricity Department. 39 miles (approx.) 3-core, paper-insulated cable. (March 18th.)

Colombia. — BOGOTA. — April 30th. Ministry of Public Works. Two electric lifts. (A.X. 4433.)*

Edinburgh.—April 18th. Electricity Supply Department. De-aerating plant and boiler feed pumps. (See this issue.)

Grimsby.—April 2nd. Electricity Department. Deansgate balancer set, switchgear and cablework. (See this issue.)

India.—April 5th. India Store Department. 27,000 yd. paper-insulated armoured cable for telephones. (See this issue.)

Kilmarnock.—April 6th. Ayrshire Electricity Board. Two water-tube boilers, with superheaters, economisers, air heaters, mechanical stokers, and coal-handling plant. (March 18th.)

Liverpool.—March 31st. City Engineer's Department. Tramway rails and fishplates, fish bolts, tie bars, and copper bonds. City Engineer, Municipal Buildings, Dale Street.

London.—HOLBORN.—April 13th. Board of Guardians. Electric lighting installation at the London Road, Mitcham, schools. (March 18th.)

LONDON COUNTY COUNCIL.—March 29th. Electric lighting installation for Sudbourne Road elementary school, Brixton, S.W. (approx. 136 points). (March 18th.)

Middlesbrough.—April 8th. Electricity Department. 12 months' supply of cables and meters. (See this issue.)

New Zealand. — WELLINGTON.—May 31st. Public Works Department. 50-kVA transformers for the Waikaremoana electric power scheme. (B.X. 3294.)* 50-kVA transformer for Arapuni scheme. (B.X. 3293.)*

June 7th. Railway sub-station equipment, Lake Coleridge electric power scheme. (B.X. 3295.)*

May 4th. General Post Office, Stores Division. Sub-station protectors. (B.X. 3286.)*

June 13th. New Zealand Railways. Machine tools, workshop equipment and overhead electric travelling cranes. (A.X. 4344.)*

June 6th. Six electric locomotives. (A.X. 4355.)* Overhead equipment for the Christchurch-Lyttelton electrification scheme. (B.X. 3301.)*

Plympton St. Mary.—March 31st. Urban District Council. H.p. cables, underground and overhead mains, h.p. and l.p. switchgear, transformers and transformer kiosks. (March 11th.)

Rumania.—BUKAREST.—April 2nd. 600,000 porcelain insulators. (B.X. 3314.)*

Southend-on-Sea.—April 9th. Light Railways and Electricity Department. Remote-controlled rotary convertors. (March 11th.) April 19th. 4,000 joint boxes. (See this issue.)

*Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed.

Burton-on-Trent.—Electricity Committee. Accepted:—
Switchgear (£189), transformer (£237).—English Electric Co., Ltd.

Cranbrook.—Board of Guardians. Accepted:—
Installing electric lighting at the Institution (£144).—Strange & Sons.

Dewsbury.—Town Council. Accepted:—
Installing electric light at 54 houses on the Ravens Lodge site (£344) and wiring 64 houses on the Thornhill site (£432).—W. Angus.

Glasgow.—Electricity Committee. Recommended:—
Six 1,500-kVA transformers (£6,300).—Metropolitan-Vickers Electrical Co., Ltd. Nine 1,500-kVA transformers (£9,450).—British Electric Transformer Co., Ltd.
Sixteen 400-kVA transformers (£5,691).—Four each from Johnson & Phillips, Ltd., British Electric Transformer Co., Ltd., Ferranti, Ltd., and Metropolitan-Vickers Electrical Co., Ltd.
Four 200-kVA transformers (£890).—British Electric Transformer Co., Ltd.; two ditto (£445).—Metropolitan-Vickers Electrical Co., Ltd.

Tramways Committee. Recommended:—
Cab-tire sheathed cable.—Macintosh Cable Co., Ltd.
Trolley wire.—Thos. Bolton & Sons, Ltd.; and R. Johnson & Nephew, Ltd.
Battery for battery truck.—Hendry Bros.

Government Contracts.—The following contracts were placed by various Government Departments during February, 1927:—

ADMIRALTY CONTRACT AND PURCHASE DEPARTMENT.
Motor alternators.—Newton Bros. (Derby), Ltd.; Mackie and Co., Ltd.
Oil-driven alternators.—W. H. Allen, Sons & Co., Ltd.
Aluminium ingots.—British Aluminium Co., Ltd.
Repairs to armature.—English Electric Co., Ltd.
Batteries and spare parts.—Chloride Electrical Storage Co., Ltd.
Battery spares.—D.P. Battery Co., Ltd.
Electric bells, &c.—Walters Electrical Mfg. Co., Ltd.; W. McGeoch & Co., Ltd.; A. Graham & Co., Ltd.; Engineering and Lighting Co., Ltd.; Bonella Bros.
Electric cables.—Enfield Cable Works, Ltd.; General Electric Co., Ltd.; Anchor Cable Co., Ltd.; Edison Swan Cables, Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Hooper's Telegraph & I.R. Works, Ltd.; Johnson & Phillips, Ltd.; Macintosh Cable Co., Ltd.; Siemens Bros. & Co., Ltd.; St. Helens Cable and Rubber Co., Ltd.; Greenwich Cable Works, Ltd.; Standard Telephones & Cables, Ltd.
Clips for electric cables.—Freckleton & Co.; Hawkers, Ltd.; R. & F. Keates; E. Showell & Sons, Ltd.
H.p. air compressor.—P. Brotherhood, Ltd.
Electric overhead travelling crane.—Herbert Morris, Ltd.
Electric table fans.—General Electric Co., Ltd.
Motor-generators.—Newton Bros. (Derby), Ltd.
Feed-water heaters.—G. & J. Weir, Ltd.
Electric light installations.—G. E. Taylor & Co.; Johnson and Phillips, Ltd.
Lampholders.—W. McGeoch & Co., Ltd.; General Electric Co., Ltd.; Rainsford & Lynes; Edison Swan Electric Co., Ltd.
Projector lamps and parts.—Sperry Gyroscope Co., Ltd.
Lanterns, &c.—W. McGeoch & Co., Ltd.; London Electric Firm; Engineering and Lighting Equipment Co., Ltd.; Hawkers, Ltd.
Note magnifiers and tuners.—Radio Instruments, Ltd.
Stoneware troughing and tiles.—Doulton & Co., Ltd.
Switches, &c.—W. McGeoch & Co.; Bertram Thomas; Edison Swan Electric Co., Ltd.; Player & Mitchell; Edwards Bros., Ltd.; Gabriel & Co.; Park Royal Engineering Co., Ltd.; Hawkers, Ltd.; D. H. Bonnella & Son; Tok Switches, Ltd.
Telephone receivers.—S. G. Brown, Ltd.
Aerial wire.—Connollys (Blackley), Ltd.
Copper wire.—W. T. Henley's Telegraph Works Co., Ltd.; St. Helens Cable & Rubber Co., Ltd.; Ward & Goldstone, Ltd.; General Electric Co., Ltd.

WAR OFFICE.

Air compressor.—Broom & Wade, Ltd.
90 c/m searchlight lamps.—Park Royal Engineering Co., Ltd.

AIR MINISTRY.

Accumulators.—Peto & Radford, Ltd.
Direction-finding receiver.—Marconi's Wireless Telegraph Co., Ltd.
Generators.—W. Mackie & Co., Ltd.; Newton Bros. (Derby), Ltd.
Magnetos and spares.—British Thomson-Houston Co., Ltd.
Receivers.—H. W. Sullivan, Ltd.
Valves.—General Electric Co., Ltd.

POST OFFICE.

Telegraph apparatus.—Creed & Co., Ltd.
Telephone apparatus.—Phœnix Telephone & Electric Works, Ltd.; Siemens Bros. & Co., Ltd.; Standard Telephones & Cables, Ltd.; Sterling Telephone and Electric Co., Ltd.
Testing and protective apparatus.—Evershed & Vignoles, Ltd.; Phœnix Telephone & Electric Works, Ltd.; Power Equipment Co., Ltd.
Battery stores.—C. A. Vandervell & Co., Ltd.
Cable (various).—British Insulated Cables, Ltd.; Callender's Cable & Construction Co., Ltd.; Connollys (Blackley), Ltd.; Enfield Cable Works, Ltd.; W. T. Glover & Co., Ltd.; Hackbridge Cable Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; Johnson and Phillips, Ltd.; Macintosh Cable Co., Ltd.; Pirelli-General Cable Works, Ltd.; Standard Telephones & Cables, Ltd.; Union Cable Co., Ltd.
Dry cells.—Siemens Bros. & Co., Ltd.
Loading coils.—General Electric Co., Ltd.; Siemens Bros. and Co., Ltd.
Cords for telephones.—British Insulated Cables, Ltd.; Phœnix Telephone & Electric Works, Ltd.; Siemens Bros. & Co., Ltd.; Standard Telephones & Cables, Ltd.
Wallboards.—Venesta, Ltd.
Bronze wire.—T. Bolton & Sons, Ltd.; Elliotts Metal Co., Ltd.; Richard Johnson & Nephew, Ltd.; Shropshire Iron Co., Ltd.; F. Smith & Co. (incorporated in the London Electric Wire Co. & Smiths, Ltd.).
Electric lighting installation at Langham new telephone exchange.—Electric Power Installation Co., Ltd.
Telephone exchange equipment.—Carpet Manufacturing Co., Ltd. (Kidderminster); Borough of Hove Town Council; Newcastle-on-Tyne Corporation; Middlesbrough Co-operative Society, Ltd.: Relay Automatic Telephone Co., Ltd. Midland Bank, Ltd. (Poultry, E.C.): General Electric Co., Ltd. Sub-contractors: W. Jones & Co. for ringing machines. Kensington: General Electric Co., Ltd. Sub-contractors: Newton Bros. (Derby), Ltd., for charging machines; Crompton and Co. for ringing machines; D.P. Battery Co., Ltd., for batteries. Epsom: Automatic Telephone Manufacturing Co., Ltd. Beckenham (Kent): Siemens Bros. and Co., Ltd. Sub-contractors: English Electric Co., Ltd., for charging machines; Crompton & Co. for ringing machines; Hart Accumulator Co., Ltd., for batteries. Fleet (Hants.) and East Grinstead: Siemens Bros. & Co., Ltd. Riverside (Hammersmith), Finchley, East, and Clissold: Standard Telephones & Cables, Ltd.
Telephone repeater-station power plant.—Halesworth, Suffolk: Newton Bros. (Derby), Ltd. Sub-contractors: Hart Accumulator Co., Ltd., for batteries; Ruston & Hornsby, Ltd., for engines. Taunton: Newton Bros. (Derby), Ltd. Sub-contractors: Premier Accumulator Co. (1921), Ltd., for batteries; Ruston and Hornsby, Ltd., for engines.

CROWN AGENTS FOR THE COLONIES.

Cable.—Shropshire Iron Co., Ltd.
Carbons.—Kolok Mfg. Co., Ltd.
Casing and tubing.—British Mannesman Tube Co., Ltd.
Fuse.—Bickford, Smith & Co., Ltd.
Telephone and telegraph materials.—Siemens Bros. & Co., Ltd.: Ericsson Telephones, Ltd.; Standard Telephones and Cables, Ltd.
Train lighting materials.—J. Stone & Co., Ltd.
Turbine spares.—Brush Electrical Engineering Co., Ltd.
Wireless apparatus.—Marconi's Wireless Telegraph Co., Ltd.

Hamilton.—Town Council. Accepted:—
Electric lighting installation at Udston Hospital extensions (£183).—W. Y. McAdam.

London.—HAMMERSMITH.—Electricity Committee. Recommended:—
500 yd. h.p. cable (£194).—Standard Telephones & Cables, Ltd.
Work in connection with the construction of the 36-in. and 40-in. discharge pipes (£3,014).—T. Muirhead and Co., Ltd.

ADMIRALTY.—
Resistance rods.—Edison Swan Electric Co., Ltd.

METROPOLITAN WATER BOARD.—Recommended:—
Nine mechanical stokers (£2,215).—James Hodgkinson (Salford), Ltd.
Coal-handling plant and bunkers (£1,786).—Hepburn Conveyor Co., Ltd.

CAMBERWELL.—Finance Committee. Recommended:—
Maintenance of electric lighting, heating and power installations at Town Hall and public buildings for the year.—Commercial Telephone and Electrical Co., Ltd.

ISLINGTON.—*Correction.*—The name of one of the contractors for the supply of electric lamps for 12 months recorded on page 437 of the March 18th issue is Nelson Electric Co., Ltd., of Merton Park, S.W. (not Milton Electrical Co., Ltd.).

BATTERSEA.—Electricity Committee. Recommended:—
Cable (annual contracts).—Callender's Cable & Construction Co., Ltd.
Electricity meters.—Chamberlain & Hookham, Ltd., and Ferranti, Ltd.
Bitumen.—Dussek Bitumen Co., Ltd.
Transformers at premises of Messrs. Garton & Co., Ltd. (£419), and for Latchmere Road sub-station (£267).—British Electric Transformer Co., Ltd.

Manchester.—According to the *Manchester Daily Dispatch*, a £4,000 contract for a generator and other electrical equipment has been placed by the Corporation Electricity Committee with a Belgian firm, and a question as to why it was not given to a British company will be asked at the next meeting of the City Council. The lowest offer by the British tenderers, which included some in Manchester, competing for the offer, was over £1,000 higher than that quoted by the Belgian concern.

South Africa.—CAPE TOWN.—Electricity Committee. Accepted:—
775 yd. cable (manufactured by Deutsche Kabelwerke A.G.) (£303).—A. Vaux, Ltd.
Four 40-kVA transformers (£263).—Metropolitan-Vickers Electrical Co., Ltd.

JOHANNESBURG.—Union Tender Board.
Dry cells and battery material for the Posts and Telegraphs Department.—British General Electric Co., Ltd., Siemens Bros. & Co., Ltd., and the South African General Electric Co., Ltd.
—*S.A. Mining and Engineering Journal.*

Spalding.—Urban District Council. Accepted:—
38 pumps and electric motors for the new sewage scheme (£7,516).—Pulsometer Engineering Co., Ltd.

Swinton and Pendlebury.—Urban Council. Accepted:—
750-kVA transformer for the Bridge Street sub-station (£568).—Ferranti, Ltd.

Tain.—Accepted:—
Installing electric lighting at the new church hall.—A. Cameron.

The "Electrical Review" Service Department.

INQUIRIES must be accompanied by a stamped addressed envelope.

We should be glad to learn the names and addresses of makers of the following:—

SURE GRIP shade holders.
WILSON ice cream freezer.

Forthcoming Events.

Physical Society.—Friday, March 25th. Imperial College of Science, S.W. 5 p.m. Ordinary meeting.

Birmingham Electric Club.—Friday, March 25th. Grand Hotel. 7 p.m. "Electricity Supply in the Midland Area." Mr. S. T. Allen.

North-East Coast Institution of Engineers and Shipbuilders.—Friday, March 25th. Newcastle-on-Tyne. 6 p.m. "Pure Science." Sir Richard Glazebrook, F.R.S.

Royal Institution.—Saturday, March 26th. 3 p.m. "Alpha Rays and Atomic Structure." Sir Ernest Rutherford, F.R.S.

Electrical Power Engineers' Association (Northern Division).—Saturday, March 26th. Midland Hotel, Manchester. 5.30 for 6 p.m. Annual dinner.

(Southern Division).—Friday, April 1st. Institution of Electrical Engineers, London. 7 p.m. "Principles of Operation and Modern Application of Automatic Voltage Regulators." Mr. H. E. Angold.

Electrical Supply Commercial Association (Greater London Division).—Saturday, March 26th. Poland Rehearsal Rooms. 7.45 p.m. Dance.

Nottingham Society of Engineers.—Monday, March 28th. Victoria Station Hotel. 7.30 p.m. "Ten Minutes' Papers."

Royal Society of Arts.—Monday, March 28th. 8 p.m. Cantor Lecture. "Some Industrial Applications of Electrothermics." Mr. G. I. Finch.

Institutions of Civil, Mechanical, Electrical, Municipal and County, and Locomotive Engineers (Yorkshire Sections).—Joint delegation. Wednesday, March 30th. Mappin Hall, Sheffield. 7 p.m. "Railways or Roads."

Institution of Production Engineers.—Wednesday, March 30th. 83, Pall Mall, S.W. 7.30 p.m. "The Development of Rustless and Allied Steels." Dr. W. H. Hatfield.

Faraday Society.—Wednesday, March 30th. Burlington House, Piccadilly, W. 3 p.m. Second Experimental Report to the Atmospheric Corrosion Research Committee. Dr. W. H. J. Vernon.

Institution of Electrical Engineers.—Thursday, March 31st. London. 6 p.m. "The Applications of Electricity in Warships." Mr. W. McClelland.

(North-Eastern Centre).—Monday, March 28th. Literary and Philosophical Society, Newcastle-on-Tyne. 7 p.m. "The Number of Tests Required to Establish the Rupturing Capacity of an Oil Circuit Breaker." Messrs. W. B. Whitney, C. E. R. Bruce, and E. B. Wedmore.

(South-Midland Centre).—Wednesday, March 30th. University, Birmingham. 7 p.m. "The Stability of Large Power Systems." Mr. F. H. Clough.

Edinburgh Electrical Society.—Thursday, March 31st. Royal Scottish Society of Art. 8 p.m. "Manufacture of Conduits." Mr. C. H. Walker.

Institution of Mechanical Engineers.—Informal Meeting.—Friday, April 1st. London. 7 p.m. "British Empire and Overseas Trade." Major A. W. Farrer.

Notes.

Retford Electricity Undertaking.

On March 21st the Mayor of Retford, Coun. J. W. Iremonger, officially inaugurated the new electricity undertaking at Retford, which was described in our last issue. At the ceremony, Alderman W. N. Brackett, J.P., chairman of the Electricity Committee, pointed out that the Corporation had been allowed to erect a power station apart from the super stations which were being erected all over the country. A unique feature of the undertaking was the installation of a waste-heat boiler for generation purposes. At a celebration luncheon which followed the opening, Viscount Galway, in proposing the "Retford Electricity Undertaking," said that he hoped the new electricity scheme would bring further prosperity to the town. Mr. A. Hugh Seabrook, consulting engineer for the scheme, supported the toast and said that the new power station was the first where, by harnessing the gas works to the undertaking, the waste heat was turned into electricity for the use of the town. With regard to the elaborate foundation work, it was the first occasion that the particular process had been used, except in collieries and abroad. Even if the town were in the future obliged to take a supply in bulk from one of the great power stations nothing would be wasted. Ald. Brackett, in reply, said that the subject of electricity was first raised in Retford in 1904, and the first clause of a petition presented to the Town Council against the proposal read: "That the electric light is not the light of the future, and is in no way likely to supersede gas either as an illuminant or for heating purposes." The present Order was granted in 1924, and in 1925 the Corporation decided to go on with the scheme. Sanction had been obtained for loans amounting to £51,000, but probably the cost of the undertaking was now in the neighbourhood of £40,000. Ald. Williamson gave the toast of "The Contractors," and Mr. H. N. Bickerton, of the National Gas Engine Co., replied.

In the article on Retford's electricity supply in our last issue we referred to one of the air compressors as being driven by a G.E.C. motor. We are informed by the main contractors for the generating plant, the Electric Construction Co., Ltd., that this is incorrect, and should read "driven by an E.C.C. motor."

Late Legal.

British Thomson-Houston Co., Ltd., *v.* Metropolitan-Vickers Electrical Co., Ltd.

Lords Dunedin, Sumner and Blanesburgh this week continued the hearing in the House of Lords of the appeal: the British Thomson-Houston Co., Ltd., *v.* the Metropolitan-Vickers Electrical Co., Ltd. The question in dispute is whether the Letters Patent of 1912 granted to Emanuel Rosenberg (of which the respondents are legal owners) is valid. Both Mr. Justice P. O. Lawrence and the Court of Appeal found infringement by the appellants, but while the former held the patent to be invalid, the latter declared it to be valid, and the question of validity was therefore taken to the House of Lords. The patent, which, the appellants maintain, is invalid, as being anticipated by the Tesla specification of 1891, is for an invention of improvements relating to synchronous dynamo-electric machines. Their Lordships reserved judgment.

The Electricity of Dust Clouds.

A paper on the above subject submitted at a recent meeting of the Physical Society of London by Mr. G. B. Deodhar, M.Sc., Physics Department, University of Allahabad (India), was taken as read in the absence of the author. Observations on the electrification of various dusts have been made by using a large volume of air at a high speed. In some cases the sign of electrification observed agrees with that found by Rudge. It appears that the electricity developed is of a frictional nature; quantitative estimates show that chlorides of sodium and potassium are equally effective, but sodium nitrate is about 4½ times as efficacious as potassium nitrate. It is shown graphically that, other things being the same, the number of volts developed by blowing increases very rapidly as the size grows less. Dr. P. E. Shaw has recently sent a paper bearing on this topic to the Society. The effects, however, which he obtained are due to the impact of only two like bodies, and in this way the condition of the impacting surfaces can be ascertained and varied at will.

Boiler Explosion Report.

We have received a copy of the report on a preliminary inquiry into the cause of the explosion of a water-tube boiler at the power station of the Merthyr Electric Traction & Lighting Co., Ltd., Merthyr Tydfil, Glamorganshire, in November last, when one of the tubes ruptured for a length of about 12 in. The explosion was caused by the overheating of the tube due to an insufficient quantity of water in the boiler. It is not clear how the explosion could have occurred. Although water showed in the gauge glass, the low-water alarm was blowing 15 mins. before the explosion. The attendant, who blew the gauge glass through and found no water, appears to have been slow in taking the necessary action. It seems probable that when the fire was first lighted the water level was already dangerously low.

Courses for Teachers in Technical Schools.

The Board of Education is making arrangements for short courses to be held in the summer for teachers in recognised technical schools, &c., in England and Wales, including Engineering Science and Electrical Engineering, at Oxford. Teachers who desire to attend any of these courses must make application to the Board of Education as soon as possible, and in any case before April 13th, 1927.

National Coal Resources Survey.

In pursuance of the physical and chemical survey of the national coal resources, which is one of the main aspects of the fuel research work of the Department of Scientific and Industrial Research, a committee has been appointed to deal with the survey of the coalfields of Durham and Northumberland. Committees are already at work in five other areas.

Electrical Association for Women.

At the invitation of the General Electric Co., Ltd., over 80 London members of the above Association visited the Ideal Home Exhibition, Olympia, on March 16th, and they were particularly interested in many of the company's exhibits.

The last of the series of evening lectures, which will be held on April 6th, is to take the form of an informal social evening. A short lecture will be given on women's place in the American electrical industry, after which there will be a discussion on the possibilities of trained women playing a greater part in the domestic electrical development of this country.

The inaugural meeting of the South Wales and Monmouthshire Branch of the Association was to be held at the City Hall, Cardiff, on March 24th, when the Viscountess Rhondda, J.P., was to be appointed as the first president of the branch, and Mrs. Tyler the hon. secretary.

Appointments Vacant.

Chief engineer (£312) for the Greenwich and Deptford Institution and Hospital. Sub-station attendant (79s.) for the Stoke Newington Borough Electricity Department. Engineer for the Red Hill Hospital, Edgware (£5). Draughtsmen and technical officer for illumination work for the Royal Aircraft Establishment. Shift charge engineer for the Crewe Corporation electricity works. Electrical assistants in the Chief Engineer's Department (97s. 3d.) for the L.C.C. (See our advertisement pages to-day.)

Electric Vehicle Parade.

On Saturday afternoon, March 26th, the Commercial Motor Users' Association will hold its annual parade of commercially-driven vehicles in Lincoln's Inn Fields, London. On this occasion there will be a very representative display of electric road vehicles, various types and sizes; about 25 entries have been received. A silver plaque and certain prizes are being awarded in this class by the Electric Vehicle Committee of Great Britain. The judges will be Col. R. E. Crompton, Mr. A. E. McKenzie, and Mr. A. C. Cramb.

Electric vehicles have been entered in the parade by the following firms, amongst others:—Brown & Polson, Ltd.; Carlyle Laundry; Carter, Paterson & Co., Ltd.; Chloride Electrical Storage Co., Ltd.; Hackney Borough Council; Hovis, Ltd.; Liberty & Co., Ltd.; London Wholesale Dairies, Ltd.; Meux's Brewery Co., Ltd.; Savoy Hotel, Ltd.; Watney, Coombe & Reid, Ltd.; and the Willesden Urban District Council.

Research and the Metal Industries.

An exhibition which has been opened to the public at the Science Museum, South Kensington, affords some indication of the assistance given to British metal industries by the research and auxiliary services of an industrial research organisation, the British Non-Ferrous Metals Research Association, which, with the co-operation of the industry through membership of the Association, carries on research work and maintains a highly organised information service. The exhibition is concerned chiefly with eight of the Association's researches, chosen from among 18 major investigations at present in progress. Those selected are typical of the character and wide range of the work which is being done, and the exhibits have been set out to give some idea of the scope of each piece of work and the progress which has so far been made. They include the effect of impurities on the properties of copper, gases in copper castings, the jointing of metals, die casting alloys, and "wiped" plumbers' joints.

A Conference on Dimensions of Nuts and Bolt Heads.

An important conference of makers of bolts and nuts, as well as the engineers who use them, is being convened by the Screw Threads Committee of the British Engineering Standards Association, and will take place in London on Wednesday, March 30th. The object is to discuss the question of the width and thickness of nuts and bolt heads from the standpoint of the practicability of a reduction on the standard sizes ordinarily used.

The Continental countries which have adopted the Whitworth screw thread as one of their standards have been using nuts which are smaller than the British Standard Whitworth, and as the question of arriving at a uniform standard is engaging their attention as well as that of the United States of America, and the B.E.S.A., as the national standardising body in Great Britain, has been invited to participate, the Screw Threads Committee has felt it desirable to make itself acquainted with the wishes of both makers and users concerned. Invitations to send delegates to the conference have been sent to a large number of institutions, trade associations, &c., and any who may be interested in the matter are invited to communicate with the Secretary of the British Engineering Standards Association, 28, Victoria Street, Westminster, S.W.1.

Fatality.

Fred. Green, employed at Sherdley collieries, St. Helens, on March 17th received a fatal electric shock whilst attending to the h.p. switchgear which controls the main shaft pump.

The Electro-Deposition of Rubber.

Writing to *Nature* of March 12th, Mr. S. E. Sheppard states that although rubber is a non-conductor, the deposit of latex rubber particles, with or without other filling material, forms a spongy gel which is still permeated by the intermicellar liquid, which, of course, is an electrolytic conductor. Consequently the electro-deposited rubber is not actually an insulator, but is perfectly analogous to a porous diaphragm electrolytically connected with a metallic anode. Such limitations as exist with regard to the thickness of coating depend mainly on other conditions, therefore, than the formation of an insulating layer.

The subject was referred to on p. 155 of our issue of January 28th, 1927.

B.E.S.A. Publication.

The British Engineering Standards Association has recently issued a new B.S.S. No. 142, 1927, for electrical protective relays. This forms one of a series of specifications for electrical instruments which is about to be issued. The relays dealt with are classified according to the functions they perform, and to the constructional principles involved. Relay contacts are also classified according to their function and mode of operation. The specification proper deals with the limits of current-, voltage-, and time-setting; the rating of the contacts; consumption of the relays; limits of error; and insulation and voltage tests, &c. The specification should prove of great interest to power-station engineers and other users of protective relays, as although it is concise it deals with the classification and performance of relays in a very comprehensive manner. Copies of this new specification may be obtained from the B.E.S.A., Publications Department, 28, Victoria Street, London, S.W.1, price 2s. 2d., post free.

Manchester Steam Users' Association.

The annual report of the Committee of Management of the Manchester Steam Users' Association shows that for the year ended December 31st, 1926, the revenue of the Association was £41,533, and that after meeting all expenses there was a surplus of £3,627. The total number of examinations of boilers made during the year was 26,045. The fact that the Association has again been able to repeat that during the whole of its existence, 72 years, no preventable explosion has occurred on any boiler which has borne the Association's guarantee and certificate of safety is claimed as a tribute to the thoroughness with which the work of inspection is carried on. During the period under review reports were received of 55 preliminary inquiries held by the Board of Trade under the Boiler Explosions Acts of 1882 and 1890. The membership at the end of the year was 1,717.

I.E.E. Students' Dinner.

The 20th annual dinner of the London Students' Section of the Institution of Electrical Engineers was held at the Imperial Hotel, Russell Square, London, on March 18th, when Mr. E. H. Harwood, chairman, presided. In proposing "The Institution of Electrical Engineers," Mr. S. H. Hart, hon. secretary, thanked the Council for the help which the Section had received from it, particularly with regard to the Students' Continental tour last year.

Dr. W. H. Eccles, in reply, commented on the affection which was shown in all sections of the Institution. The body was making itself felt in all walks of life. The strength brought about by the unanimity of the members was due to the diversity in the representation of all the branches of the industry.

Mr. R. Paul, the Council's representative, in proposing "The Students' Section," impressed upon the Students the necessity of stimulating the imagination. The Council was pleased at the increasing tendency of the Students to take part in the discussions at the meetings. There were now 6,300 Students in the Institution ranks. He congratulated the Section on the high quality of the papers presented at its meetings.

Mr. E. H. Harwood replied, and said that the outstanding feature of the past year's work of the Section was the joint meetings which had been held with the Civil and Mechanical Institutions. It was a good sign that the visits of the Section were always full.

Mr. R. A. Brockbank, vice-chairman, in proposing "Our Guests," heartily welcomed the visitors present, of whom Dr. Eccles was the guest of the evening.

In a breezy reply, Capt. P. P. Eckersley, chief engineer of the British Broadcasting Corporation, pointed out the necessity for the technical and commercial sides of the profession to see each other's points of view. In commenting on the work of the B.B.C., he said that the one thing which would keep British broadcasting to the front was good engineering. He extended an invitation to any of the members to visit the B.B.C. studios and see what was being done.

E.P.E.A. Dinner.

The seventh annual dinner of the London Western Section of the Electrical Power Engineers' Association was held at St. Ermin's Hotel, Westminster, on Saturday last, Mr. W. E. Rogers, chairman of the Section, presiding.

After the loyal toast, Mr. A. C. Stewart, junior vice-president, proposed "The Association." He compared the position of the electricity supply engineer before the advent of the E.P.E.A. with that of to-day, and enumerated some of the advantages that the Association had brought about for its members. The evil of the premium pupil had been greatly reduced, although it still existed to some extent. He warned the members of the danger of becoming slack as a result of the success of the Association, and declared that a properly organised electricity supply industry was now impossible without such a protective body as theirs.

In reply, Mr. A. W. Crompton, president, said that the prestige of the Association had in no way suffered as a result of the history of the past two years. There were now over 4,000 members. The privilege which they had during the general strike of maintaining to some extent law and order gave them the right to criticise the industrial position. A fact that was not fully realised was that, whatever was forthcoming from the Electricity (Supply) Act, the job rested with the technical engineer. If the chemical industry could cover the displacement of its employés, then the electricity industry should also be able to.

In proposing "Our Section and Our Chairman," Mr. E. G. Hildebrand paid a tribute to Mr. Rogers, who replied in a suitable manner.

During the evening musical items were rendered by a number of artistes.

Extensions at Basingstoke.

An interesting ceremony took place recently at the Basingstoke electricity works, when the new extensions to the generating plant were started up. The new equipment includes a 600-h.p. Diesel oil engine, by Messrs. Mirrlees Bickerton and Day, Ltd., directly coupled to a 410-kW generator manufactured by the General Electric Co., Ltd. The engine is of the 6-cylinder totally-enclosed type and runs at 250 r.p.m. The cylinder bore is 17¼ in., and the stroke 20 in. The new plant brings the total capacity of the station up to 1,530 kW. The maximum load recorded to date is 916 kW.

Newton's Bicentenary.

Last week-end the 200th anniversary of the death of Sir Isaac Newton was celebrated by a meeting of scientific and mathematical men at Grantham, his birthplace. Dr. Jeans, secretary of the Royal Society, presided at a meeting at the King's School, where Newton was taught, and declared that he was the greatest man of science that the human race had ever seen. Sir J. J. Thomson delivered an address dealing mainly with Newton's optical work, and Sir Frank Dyson lectured on his work in astronomy, which alone had placed him above all other scientific investigators. Other speakers dealt with Newton's mathematical achievements.

Institution Notes.

Institution of Electrical Engineers.

North-Midland Centre.—The following nominations have been made by the Committee for vacancies arising September 30th, 1927:—Chairman, Mr. J. Edwin Storr; vice-chairmen, Messrs. F. S. G. Hinings and C. Nelson Hefford; hon. secretary, Mr. H. Cecil Fraser; committee (five vacancies), Messrs. H. G. Fraser, W. P. Bramwell, P. Maxwell, R. M. Longman, W. F. Mylan, and L. H. Roberts.

Summer Meeting.—The summer meeting of the Institution will be held at the North-Eastern Centre, in and around Newcastle-on-Tyne, from June 14th to 17th.

Western Centre.—Home lighting was the subject of a lecture delivered by Mr. R. B. Mitchell, of Glasgow, to the members of the Institution at the University College of the South-West, Exeter, on March 14th. He stated that there were eight million unwired houses in Great Britain; if each required on an average nine lights (taking £10 as the average cost of wiring), an expenditure of 80 million pounds on installation work alone would be involved, leaving out of account altogether the extra plant which would be required at the power stations. Notwithstanding the fact that between 60 and 70 per cent. of the homes of Great Britain were within the areas of electricity supply undertakings, data showed that only about 14 or 15 per cent. of them were wired.

South-Midland Wireless Sub-Section.—The fourth meeting of the Wireless Sub-Section of the Institution of Electrical Engineers (South-Midland Centre) was held at Birmingham on March 16th, when Mr. C. Robinson, B.A., lectured on the "Characteristics of Audio-frequency Amplifiers used in Telephonic Repeaters." The lecture was preceded by a visit to the Birmingham Post Office telephone repeater station in Hill Street, where members spent an interesting time inspecting various sections of the plant. Tea was partaken of at Birmingham University, where the meetings are held.

Institution of Chemical Engineers.

Examinations for the Associate Membership of the Institution will be held in June and July next. Particulars can be obtained from the hon. registrar, Mr. C. S. Garland, Abbey House, Westminster, S.W. (See our advertisement pages to-day.)

Our Personal Column.

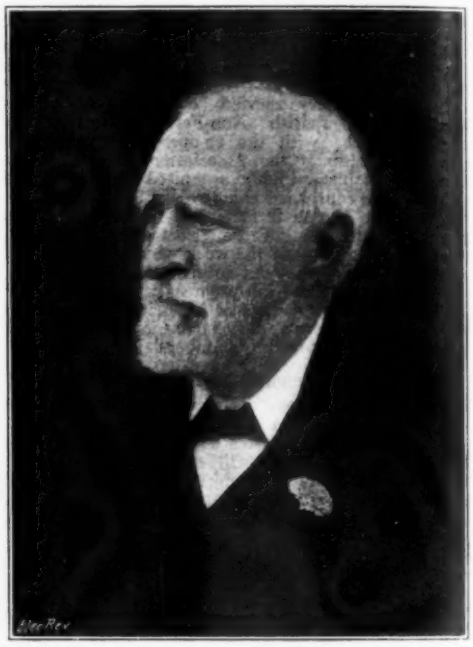
Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements.

Reference was made to the illness of Mr. James Taylor at the meetings on Monday last of the British Insulated Cables, Ltd., and the Midland Electric Corporation for Power Distribution, Ltd., of both of which companies he is chairman. Sir Arthur Stanley, who presided in his place at the former company's meeting, stated that Mr. Taylor underwent a serious operation in November, and was now in the south of France. Mr. Sinclair, who acted as chairman at the Midland Electric meeting, said that Mr. Taylor was expected back in this country in a few weeks. The hope expressed by both speakers that he will shortly be able to resume his active interest in the affairs of the businesses with which he has so long been connected will be shared by a large number of Mr. Taylor's friends in the electrical industry.

Mr. L. A. Horsfall, of Ing Lees, Marsden, has resigned his position as manager of Messrs. E. Brook, Ltd.'s, Leicester office, and has taken over the sole representation in the Midlands of the B.E.N. Patents, Ltd., 96-98, Victoria Street, S.W.1.

After 26 years' service with the Manchester Corporation Tramways Department, Mr. F. E. Handy, electrician, and latterly general sheds foreman, retired last week. Mr. Handy has seen service with the Vancouver and New Westminster Tramways and the Hamilton and Barnsville Railway Company, and was foreman of the Stoke-on-Trent Tramways from 1898 to 1901.

The Electrical Review sends its greetings and hearty congratulations in advance to Mr. George Offor, of Peak Hill, Sydenham, who, on Wednesday next, March 30th, reaches the great age of 100 years. In the days of his youth—some twenty years ago—Mr. Offor was a frequent and much esteemed contributor to our pages, and he was able to climb our difficult stone staircases with a spirit and energy which filled many a younger man with envy. We reproduce the accompanying photograph from our Jubilee Issue of November 17th, 1922, where, on p. 704, a brief account of Mr. Offor's electrical record was given. He has as full a knowledge as anybody of early electric lighting legislation and finance in this country, counting among his other offices that of membership of Lord Thurlow's Committee appointed to consider the amendment of the Electric Lighting Act of 1882. When Mr. Offor reached his eightieth birthday electrical friends gave a dinner in his honour. Since then electricity supply has



Elliott & Fry. [*London.*

Mr. George Offor,
who celebrates his 100th birthday on March 30th.

made wonderful strides, and we wish the centenarian of the electrical industry years of happiness and health in which to witness the acceleration of the pace of progress which is now being recorded.

Mr. W. Preston, M.P. for Walsall (who, as our readers know, is prominently associated with the electrical industry) was given an enthusiastic welcome home by hundreds of his constituents at Walsall Town Hall on Monday last week. Mr. Hurst, chairman of the local Unionist Association, presided, and referred to the illness of Mr. Preston while he was in South Africa. Mr. Preston, he said, went to South Africa not only for his health, but also to try and improve the trade of the town. Mr. Preston said that if manufacturers would get into personal touch with our own people in the Colonies, they would have a reception they little dreamt of, as the Colonies were out to do big business with English manufacturers.

Bedford Corporation Electricity Committee recommends the appointment of Mr. N. Fleming, now assistant, as station superintendent, at a salary of £520 per annum, and the promotion of Mr. A. Wilson, charge engineer, to assistant station superintendent, at a salary of £360 per annum.

The marriage took place recently at Grimsby of Mr. H. Pye, director of Pye & Co., Ltd., wireless manufacturers, Cambridge, and Miss Jennie Milson.

Mr. Henry Rowe, of Messrs. H. Rowe & Co., electrical engineers and importers, of Melbourne, Australia, is expected in London early in May, and he asks that firms requiring representation in Australia will communicate with him c/o Electrical Review.

The appointment of Mr. John Reeve Brooke as secretary to the Central Electricity Board is announced. For the past four years Mr. Brooke has been secretary of the Ministry of Transport. The offices of the Board are to be at No. 1, Charing Cross, S.W.1.

The Associated Municipal Electrical Engineers has drawn the attention of the Battersea Electricity Committee to the fact that the electrical engineer (Mr. F. A. Bond) is not being paid in accordance with the agreed scale. The Committee accordingly recommends that Mr. Bond's salary shall be raised from the present figure of £1,300 to £1,349.

Obituary.—SIR JOHN TURNEY.—The death occurred on March 17th of Sir John Turney, of Nottingham. Sir John, who was 88 years of age, was chairman and managing director of a prominent industrial concern in the city. His connection with municipal affairs dates back to the year 1873, when he entered the Nottingham Town Council, and he was the first chairman of the Electricity Committee.

MR. E. F. CARSON.—In the same issue our contemporary recorded the death of Mr. Edwin F. Carson, labour agent for Messrs. Balfour, Beatty & Co., on their Lochaber water-power scheme. Mr. Carson was motor-cycling home from Fort William when he ran into a man. He was thrown from his machine and sustained a fractured skull.

MR. J. THOMSON.—*The Times* reports the death of Mr. John Thomson, sole partner in the firm of Provand & Cairns, electrical engineers, Glasgow, as a result of a motor accident. He was driving the car at night and instead of running upon a bridge over the River Strae, swerved to the side, and the car rushed down a steep bank into the river.

MR. M. J. L. CALLI.—The death has taken place, at the age of 58 years, of Mr. M. J. L. Calli, who for upwards of 30 years had been on the staff at the electrical works of Messrs. Newton, of Taunton.

MR. A. A. DUDLEY.—The death took place recently at the age of 57 years of Mr. A. A. Dudley, who had held the position of engineering superintendent of the Wolverhampton District Electric Tramways, Ltd., and for 37 years had been connected with the system in the South Staffordshire area.

MR. W. J. COPSEY.—The death is announced at the age of 50 years of Mr. William James Copsey, who was formerly assistant engineer at Grantham for the Urban Electric Supply Co. Latterly he had been with Messrs. Harrison & Co., electrical engineers, Newark-on-Trent.

Wills.—SIR A. S. HASLAM, of the Haslam Foundry and Engineering Co., left (according to the *Financial Times*) estate valued at £1,640,000.

The late Sir WILFRID STOKES left £55,467 gross and £35,186 net personalty.

Financial Section.

New Companies, Returns of Share Capital, Debenture Changes, Reports of Electrical Companies, Dividend Results, Transactions in Stocks and Shares.

New Companies Registered.

Northern Radio and Electrical Factors, Ltd.—Private company. Registered March 10th. Capital, £2,000 in £1 shares (1,000 7½ per cent. cumulative participating preference and 1,000 ordinary). Objects: To carry on the business of electrical, mechanical and general engineers and contractors, manufacturers and factors of and dealers in electrical or other apparatus, radio instruments, wireless apparatus, &c. The directors are:—Mrs. E. Tempest, 22, Oak Lane, Manningham, Bradford; G. W. Tempest, 22, Oak Lane, Manningham, Bradford, electrical engineer. Qualification, £1. Solicitors: F. W. Butterfield & Co., 12, Devonshire Street, Keighley.

Wand & Mitchell, Ltd.—Private company. Registered March 14th. Capital, £500 in £1 shares. Objects: To carry on the business of dealers in wireless in all its applications, electrical outfitters, dealers in electrical appliances, motor carriers, dealers in motor cars and accessories, &c. The first directors are:—S. Wand, 369, Bury New Road, Higher Broughton, Manchester; H. Michaelson, 239, Waterloo Road, Hightown, Manchester (both permanent, subject to each holding five shares). Registered office: 239, Waterloo Road, Hightown, Manchester.

East Suffolk Electricity Distribution Co., Ltd.—Registered as a public company on March 17th, with a nominal capital of £50,000 in 30,000 preferred ordinary shares of £1 each and 40,000 deferred ordinary shares of 10s. each. The profits available for distribution in any year are to be applied, first, in paying a cumulative dividend at 7 per cent. per annum on the original preferred ordinary shares, secondly, in paying a further dividend not exceeding 3 per cent. for such year on the same shares, and, *pari passu*, with such further dividend in payment of a sum of like amount by way of dividend for such year on the deferred ordinary shares, and, thirdly, in payment of any balance of such profits to the holders of the deferred ordinary shares. The objects are to carry on the business of an electric light and power company in all its branches. The subscribers (each with one share) are:—W. Mitchell, 24, Twyford Road, Ilford, Essex, clerk; A. J. Clark, 114, Barrington Road, N.8, solicitor's clerk; and five other clerks. The directors are to number not less than three nor more than seven. The Treasury is to be represented by one director. The Power Development Co., Ltd., may appoint two directors. Except as aforesaid, the directors are to be appointed by the subscribers. Qualification (except Treasury director, alternate directors and managing director (if any), who require none), £250 shares. Solicitors: Ashurst, Morris, Crisp & Co., 17, Throgmorton Avenue, E.C.

Wireless Piano Players, Ltd.—Private company. Registered March 16th. Capital, £6,600 in 6,000 8 per cent. cumulative participating preferred shares of £1 each and 6,000 deferred shares of 2s. each. Objects:—To acquire, perfect, and commercially exploit an invention or process for the electro-magnetic reproduction of wireless reception by the piano and other similar instruments, &c. The subscribers are:—L. E. Read, 93, Fairfax Road, Hornsey, N.8, solicitor's clerk; R. J. Mole, 28, Avenue Road, Kingston-on-Thames, Surrey, solicitor's clerk. The first directors are to be appointed by the subscribers. Qualification, £100 shares or stock. Solicitors: Denton, Hall & Burgin, 3, Gray's Inn Place, W.C.1. Registered office: 17, Victoria Street, S.W.1.

Junit Manufacturing Co., Ltd.—Private company. Registered March 16th. Capital, £2,000 in £1 shares. Objects: To acquire the business now carried on at 2, Ravenscourt Square, Hammersmith, as the "Rexo Engineering Co."; to adopt an agreement with H. T. Logan, and to carry on the business of mechanical, electrical, radio and general engineers, founders, smiths, machinists, tool makers, metal and wood workers, &c. The subscribers (each with one share) are:—L. J. R. King, Glen Cottage, Upper Warlingham, Surrey, incorporated accountant; J. T. Chalk, "Fairview," Upton Road, Bexley Heath, Kent, engineer. L. J. R. King signs documents as director. Qualification, £1. Solicitors: Godfrey Warr & Co., 85, Gracechurch Street, E.C.3. Registered office: Napier House, 24-7, High Holborn, W.C.1.

Official Returns of Electrical Companies.

Farndons Electric, Ltd.—P. H. Stone, of 47, Temple Row, Birmingham, ceased to act as receiver or manager on March 7th, 1927.

Electric Fans, Ltd.—Debenture dated February 25th, 1927, to secure £1,000, charged on the company's undertaking and property, present and future, including uncalled capital. Holder:—S. J. Flatau and B. Freedman, both of 6, Conduit Street, W.1.

East India Tramways Co., Ltd.—Capital, £125,000 in 15,000 preferred, 35,000 ordinary, and 75,000 deferred shares of £1 each. Return dated December 8th, 1926. 7,476 preference, 33,433 ordinary, and 75,000 deferred shares taken up. £7,489 paid on 7,476 preference and 7 ordinary shares, and including £6 paid on 24 preference shares forfeited. £108,426 considered as paid on 33,426 ordinary and 75,000 deferred shares. Mortgages and charges, nil.

Edward Deane & Beal, Ltd.—Capital, £60,000 in 20,000 preference and 40,000 ordinary shares of £1 each. Return dated December 30th, 1926. 20,000 preference and 20,009 ordinary shares taken up. £9 paid. £40,000 considered as paid. Mortgages and charges, £6,250.

D. Hulett & Co., Ltd.—Capital, £5,000 in £1 shares. Return dated November 11th, 1926. 4,420 shares taken up. £320 paid. £4,100 considered as paid. Mortgages and charges, nil.

Hall Telephone Accessories, Ltd.—Capital, £30,000 in £1 shares. Return dated December 16th, 1926. All shares taken up. £6,501 paid (being £1 per share on 2 and 10s. per share on 12,998 shares). £17,000 considered as paid on 17,000 shares. Mortgages and charges at date of return, nil. Since registered: Debenture dated January 6th, 1927, to secure £25,000.

Harry Morser & Co. (Wireless), Ltd.—H. E. F. Connolly, of 12, Nutley Lane, Reigate, was appointed receiver on March 3rd, 1927, under powers contained in debenture dated November 30th, 1925.

Pickvance, Ltd.—Capital, £5,000 in 2,000 preference and 3,000 ordinary shares of £1 each. Return dated January 3rd, 1927. 600 preference and 1,002 ordinary shares taken up. £650 paid on 450 preference and 200 ordinary shares. £952 considered as paid on the remainder. Mortgages and charges, £1,650.

Peacehaven Electric Light and Power Co., Ltd.—Capital, £20,000 in 15,000 preference shares of £1 each and 20,000 ordinary shares of 5s. each. Return dated November 8th, 1926. 14,038 preference and 16,052 ordinary shares taken up. £17,909 18s. 1d. paid, leaving £141 1s. 11d. in arrears. Mortgages and charges, nil.

Davis Electrical Co., Ltd.—Capital, £1,000 in £1 shares. Return dated December 31st, 1926. 677 shares taken up. £377 paid. £300 considered as paid. Mortgages and charges, nil.

Brookhirst Switchgear, Ltd.—Capital, £550,000 in £1 shares. Return dated December 27th, 1926. 126,002 shares taken up. £30,502 paid. £95,500 considered as paid. Mortgages and charges, £25,000.

Western Telegraph Co., Ltd.—Capital, £3,500,000 in £10 shares. Return dated December 9th, 1926. 311,895 shares taken up. £2,339,650 paid. £779,300 considered as paid. Mortgages and charges, £818,675.

Venezuela Telephone and Electrical Appliances Co., Ltd.—Capital, £280,000 in 140,000 ordinary and 140,000 preference shares of £1 each. Return dated December 21st, 1926. 103,091 ordinary and 103,091 preference shares taken up. £149,676 paid on 46,585 ordinary and 103,091 preference shares. £56,556 considered as paid on the remainder. Mortgages and charges, £140,300.

Bullers, Ltd.—Capital, £400,000 in 20,000 ordinary and 20,000 preference shares of £1 each. Return dated December 31st, 1926. 15,593 ordinary and 15,000 preference shares taken up. £150,070 paid on 7 ordinary and 15,000 preference shares. £155,860 considered as paid on 15,586 ordinary shares. Mortgages and charges, £217,800.

Southern Electric Free Wiring Co., Ltd.—Capital, £5,000 in £1 shares. Return dated December 29th, 1926. 1,510 shares taken up. £1,510 paid. Mortgages and charges, nil.

Delagoa Bay Development Corporation, Ltd.—Capital, £166,300 in 267,400 ordinary shares of 10s. each and 130,400 preference shares of 5s. each. Return dated December 7th, 1926. 267,400 ordinary and 68,400 preference shares taken up. £105,800 paid on 177,400 ordinary and 68,400 preference shares. £45,000 considered as paid on 90,000 ordinary shares. Mortgages and charges, £231,100.

Davies, Kent & Stewart, Ltd.—Capital, £3,500 in 2,500 preference and 1,000 ordinary shares of £1 each. Return dated December 28th, 1926. 1,974 preference and 1,000 ordinary shares taken up. £2,974 considered as paid. Mortgages and charges, £1,050.

W. G. Cannon & Sons, Ltd.—Capital, £3,000 in £1 shares. Return dated December 31st, 1926. All shares taken up. £9 paid. £2,991 considered as paid. Mortgages and charges, nil.

British Brown, Boveri, Ltd.—Capital, £50,000 in £5 shares. Return dated November 25th, 1926. All shares taken up. £21,250 paid (being £2 10s. per share on 8,500 shares). £7,500 considered as paid (being £5 per share on 1,500 shares). Mortgages and charges, nil.

Implitico, Ltd.—Capital, £3,000 in £1 shares. Return dated December 20th, 1926. All shares taken up. £3,000 paid. Mortgages and charges, nil.

City Notes.

Marconi's Wireless Telegraph Co., Ltd.

As mentioned in our last issue, the annual meeting took place on March 13th. Senatore Marconi presided, and there was a very large attendance of shareholders. The proceedings, which lasted about five and a-half hours, were at times interrupted, but in the end the report was adopted, and the proposals of the board for reducing the capital by £1,625,019, were also carried. The chairman devoted the greater portion of his speech to the technical progress which the company was making. Discussing the "beam" system, he said that it had distinct advantages over the old system, and, moreover, many of those advantages were not possessed by any other method of long distance-communication. The capital expenditure was lower; the stations could be operated with a comparatively small amount of power; the speed of working was limited only by the mechanical limitations of the sending and receiving instruments; the stations could be used for wireless telephony; each circuit could be efficiently utilised for the simultaneous transmission and reception of telephonic as well as telegraphic messages without any mutual interference between the services; and it could be used for *facsimile* transmission, and, probably, also for television. The Canadian service, he stated, was handed over to the Post Office for official tests in October of last year and had since been opened to the public, and had been working well for four months. The Australian service had been under test by the company during recent weeks, and the previous day the Secretary of the General Post Office had stated that the Australian station had satisfied the conditions of the contract. They had also received a telegram from the Australian company to the effect that during the seven-day tests the average estimated capacity of the service was over 140,000 words per day each way, representing over three times the existing total cable traffic between this country and Australia. Referring to the present position of the company, he said that they had passed through a most trying and critical period. He frankly admitted that many of their difficulties had come about in consequence of past mistakes, but others were caused by circumstances beyond anyone's control. In conclusion, he said he wished to make it quite clear that in the event of the proposals of Mr. Nordon's committee being carried, he could follow no other course but to tender his resignation from the board, and, in consequence, also decline to accept the position of president of the company. With regard to his agreement as technical adviser to the company, he regretted to say that in the event of such proposals being approved, he would endeavour to have the agreement terminated at once. The Right Hon. F. G. Kellaway, the managing director, seconded the motion in a long speech, in which he dealt in great detail with the report of the investigating accountants and gave particulars of the losses amounting to a total of nearly £6,000,000 which had been written off. Dealing with the course of events since he became a director, he said that at his instigation a committee of directors was formed to control the policy and finances of the company, and one of the first decisions of that body was to put a stop immediately to any further investments of the money in any concerns not properly connected with the company's business. He maintained that in regard to the issue of 500,000 new shares at 27s. 6d. each in February, 1925, on the information before it at the time, the board was fully justified in making the issue at that price. Subsequent events had shown that that information was based upon too optimistic a view of the position of the company at the time, but looking back he could not admit that any precaution was not taken which any reasonable body of business men could have taken. The proposals of the board had the support of Sir Gilbert Garnsey, and their own accountants; of the four members of the advisory committee; of the Irish shareholders' association; of practically the whole Press of the country, and they had, he said, received proxies representing nearly 1¼ million shares. If the report was carried the following new members would join the board on the suggestion of Sir Gilbert Garnsey and a member of the advisory committee:—Lord Inverforth, Maj.-Gen. Sir Frederick Sykes, Lord Wester Wemyss, Sir Charles Barrie, K.B.E., and Mr. F. R. S. Balfour. In the discussion which ensued speeches were made by Sir Gilbert Garnsey, who gave it as his opinion that given a continuance of good management the company could look forward to a prosperous future; by Dr. O'Beirn, of the Irish Shareholders' Committee, supporting the proposals of the Board; and by Mr. Nordon, of the English Shareholders' Committee, who asked the shareholders to reject the report. On a show of hands, the report was adopted by a large majority, whereupon a poll was demanded by Mr. Nordon. This was taken immediately, with the result that the resolution was declared carried by 1,586,532 votes against 320,076. The retiring members of the board were re-elected, and Messrs. Kemp, Chatteris, Nicholls, Sendell and Co., and Messrs. Price, Waterhouse & Co., were appointed joint auditors.

Telegraph Construction and Maintenance Co., Ltd.

The Earl of Selborne presided over the annual meeting on March 17th, and in moving the adoption of the report (which was dealt with in our last issue, p. 445), said it was satisfactory that in a year of such exceptional difficulties they had been able to present such good results and maintain their usual dividend. At the last general meeting he referred to several important contracts which they had in hand. All of those had been successfully carried out, and in spite of the serious dislocation of trade and delay in deliveries they were able to complete the contracts within a short period of the specified dates. Referring to the position of submarine telegraphy at the present time, they had the fullest confidence in the future of the industry, despite the competition of wireless, be it telegraphic, telephonic, or photographic. A study of the map of the world showed that all great commercial centres were now so well linked up by submarine cable routes that there was little or no fear of any one place being entirely cut off from telegraphic communication. Almost all of these cables were of the ordinary type, but in the last year or so a development of the "loaded conductor" had increased the carrying capacity of a cable by four or five times, and it became evident that if such cables offered no practical difficulties, a revolution in submarine telegraphy was at hand. It was chiefly with that new development that their works had been occupied during the year under review, and three of those cables had been laid in the North Atlantic, one in Australian waters, and one in the Pacific. The loaded

cable had fully justified the confidence which they placed in it and its efficiency had been proved beyond doubt. So far they might congratulate themselves that such definite and important progress had been made, but they must remember that since the loaded cable was equal in capacity to several ordinary ones, fewer cables might be required in future, unless there was a material increase in telegraph traffic. It was not, however, the experience of the world that improvements in machinery or in methods of production defeated their own ends; every improvement in the means of production led to increased demand. How to take advantage of that improvement was the problem of the future for the submarine telegraph companies, and it was one which would undoubtedly be solved by the very able controllers of the cable-owning companies. They must, however, expect some delay before the old systems were replaced by the new, for considerable expenditure was involved not only in the loaded cables themselves, but also in the research work needed before full advantage could be taken of their high speed capacity. Their new cable ship *Dominia* was delivered in June last year, and in the recent successful laying of the long section of the Pacific cable (about 3,500 nautical miles) between Vancouver and Fanning Island, for which she was especially built, she fully justified their confidence in her design.—Mr. Colin F. Campbell seconded the motion, which was adopted after a short discussion.

Westminster Electric Supply Corporation, Ltd.

The annual meeting was held on March 16th, Lord Wargrave, P.C. (chairman) presiding. In moving the adoption of the report and accounts, the chairman said that the accounts had had to be prepared in accordance with the London Electricity (No. 2) Act, 1925. They had transferred to the London Power Co., under the terms of the above Act, the generating machinery at their Horseferry station, for which they had received payment. The whole of the generating portion of the Westminster Company's undertaking had thus passed to the Power Co. The Central Co. had also transferred the whole of its works at Grove Road, together with its main transmission lines, to the Power Co., for which payment had been made. The result had been that the Central Co. was able to capitalise a sum of £225,000, which had been divided equally between the St. James' and Westminster Companies. This had been brought into their free reserves and formed part of the £503,746 which was capitalised by the company last year. They had also repaid the loans to the two parent companies. The balance of profit for the year was £137,077, which was sufficient to pay the preference dividend and the ordinary dividend at the standard rates, leaving a balance of £1,502 to be carried forward. At the moment they could not say whether any or all of this sum was available for distribution to the shareholders. Owing to the restrictions which were in force during the general strike their output was sensibly reduced, but, nevertheless, last year it was over 2,000,000 kWh in excess of the previous year.

Underground Electric Railways of London, Ltd.

The annual meeting took place on March 15th, Lord Ashfield (chairman and managing director) presiding. The chairman, in moving the adoption of the report and accounts, first dealt with the associated companies whose accounts and meetings have already been reported in previous issues. He made particular mention of the improved position of the Associated Equipment Co., which had paid a dividend of 8 per cent., free of tax; and to the North Metropolitan Electric Power Supply Co., from which a dividend of 10 per cent. had been received. The 'bus undertaking had maintained its position, but the conditions under which the tramways operated remained bad. In accordance with his usual custom, Lord Ashfield then proceeded to review the whole question of London's traffic. He reiterated the need for co-ordination of the various services, and expressed the inability of the railway companies to extend their systems further until more equitable treatment was accorded them. Further underground railways were urgently needed. Underground railways by themselves could not be made to pay; they could only pay as integral parts of a complete system. In conclusion, the chairman referred to the income bonds, which were a burden on the company's finances, and said that in any future scheme for the raising of capital particular attention would be given to the matter.

Charing Cross Electricity Supply Co., Ltd.

The report for the year ended December 31st last shows that the gross earnings of the West End Undertakings were £323,241, and there was a total available of £142,162. Interest on debenture stock and sinking fund contributions absorb £39,184, and the preference and standard ordinary dividends are paid, leaving £468 to be carried forward. The connected load on the West End mains is now 31,235 kW, of which 17,105 kW represents lighting.

The City Undertaking shows gross earnings of £329,911 and an available balance of £212,086. Debenture and loan interest, &c., require £150,675, and after paying the preference and ordinary dividends, £411 is carried forward. The connected load is 37,587 kW, of which 13,294 kW is lighting. Under the London Electricity (No. 2) Act, the Bow generating station has been leased to the London Power Co., and both the West End and City undertakings now purchase electricity in bulk from that company. As a result of this, the figures for 1926 are not comparable with those of previous years. The Act provides that in 1971 the whole of the company's undertaking as existing at June 30th, 1925, shall be transferred, free of charge, to the London and Home Counties Joint Electricity Authority. In accordance with that Act, a sinking fund "A" has been set up to provide for the repayment of the shareholders' capital in 1971, and a further sinking fund "B" has to be instituted to deal with capital expenditure incurred since June, 1925; any balance not so provided for will be paid by the Joint Authority upon transfer. £460,800 of the reserves has been capitalised and issued to shareholders as bonus shares; the ordinary capital now stands at £1,036,800, and the standard dividend is 1s. 7.57d. per share. A reduction in charges was made at the beginning of last year, and the consumers have benefited to the extent of over £55,000. In spite of the adverse effect of the coal dispute, the directors feel justified in paying the standard dividend, although the carry-forward is thus reduced to a nominal amount. Meeting: March 30th.

International Automatic Telephone Co., Ltd.

The accounts of this company were dealt with in our last issue. The report now to hand says that notwithstanding the industrial difficulties of the past year, the results compare favourably with those of 1925, and an increased return from investments is reported. Following the annual meeting on April 8th, an extraordinary meeting is to be held for the purpose of considering certain proposals. One of the conditions originally attached to the ordinary and preference shares was that Messrs. Theodore Gary & Co. (U.S.A.), who were responsible for securing important contracts for the company, on condition that they continued to hold 10,000 deferred shares, should have the option of purchasing all or any of the preference or ordinary shares at the respective prices of 21s. 6d. and 30s. per share. The option on the ordinary shares was removed in 1925, and it is now proposed to cancel the option on the 170,338 issued preference shares. A provisional contract has been arranged with Messrs. Garv & Co. whereby they will instead have an option to subscribe for 170,338 unissued preference shares and 200,000 preference shares to be created, at the price of 21s. 6d. per share. The shareholders will be asked to ratify this agreement and sanction the increasing of the preference capital from £200,000 to £400,000.

Arbroath Electric Light and Power Co., Ltd.

Mr. George Balfour, M.P. (chairman) presided at the recent annual meeting of the company, and in moving the adoption of the report (which showed a profit of £5,441) said that the local rates paid by the company for the year were equivalent to almost ¼d. per kWh sold, and if the amount paid in income tax were added, the rates and taxes item was equivalent to approximately two-thirds of a penny per kWh. It was of no use talking about cheapening supplies by linking up stations when they were faced with an average of .66d. per kWh for local rates and taxes. The only heritable subjects owned by the company which should be ratable were the buildings of a ratable value of a few hundred pounds. The balance over this amount was merely a super tax on the industry which the consumer had to pay. He (the chairman) was associated with the Grampian Co., and negotiations had taken place with their directors for a bulk supply and possible transfer of the generating station to the Grampian Co., which would use it as a small subsidiary steam reserve station. The Grampian development was necessarily held in abeyance until the new legislative proposals of the Government assumed final shape.

Newcastle and District Electric Lighting Co., Ltd.

The annual meeting was held on March 17th, Colonel F. R. Simpson presiding. Moving the adoption of the report and accounts, the chairman said that a further amount of £4,360 of second debentures had been redeemed, and loans had been reduced by £2,973. During the year a large amount had been spent on cables and sub-stations for the supply of electricity to new consumers. The demand continued to grow, and a considerable increase in the rate of expansion was anticipated. £18,000 had been provided from profits for depreciation, making the amount written off £206,000. Dealing with rates and taxes, he said that the steady increases in rates equalled a dividend payment of 1 per cent. on the company's shares. Taking the lighting restriction due to the coal stoppage into consideration, the increase in total receipts of £1,236 might be considered satisfactory. Commenting on the new Electricity Act, he anticipated that it would be some considerable time before it caused any changes to be made in the Newcastle district.

British Electric Transformer Co., Ltd.

After meeting manufacturing costs and administrative expenses, the net profit for the past year is £63,202, and to it is added £8,950 brought forward, making £72,152. It is proposed to distribute this as follows:—To reserve, £10,000; to depreciation reserve, £5,000; preference dividend, £31,500; dividend of 5 per cent. on the ordinary shares, £16,250; carried forward, £9,402. The report records the death of Mr. George Berry, director and manager, and the appointment of Mr. F. E. Berry to the dual position. Meeting: March 29th.

Newcastle-upon-Tyne Electric Supply Co., Ltd.

The profit for the year ended December 31st last amounted to £576,421, as against £701,671 for 1925. After providing for debenture interest, &c., depreciation and contingencies reserve (£75,000), and plant renewal and improvement reserve (£25,000), and adding £41,517 brought forward, there remains £313,225. It is proposed to pay the balance of the preference dividends, and distribute 5 per cent. for the year on the ordinary shares, leaving £15,900 to be carried forward. The connections to the company's system rose from 626,689 to 657,451 h.p. The capital expenditure during the year amounted to £413,656, principally upon the high- and low-pressure distribution systems. A normal service was maintained throughout the period of the industrial disturbances, but the company's output and revenue were badly affected, while working costs were considerably increased. The company adopted the policy of using the cheapest class of English coal in preference to foreign coal of better quality at enhanced prices. Since the termination of the coal dispute the output has considerably increased as compared with the corresponding period of last year. Meeting: Newcastle, March 29th.

Llanelly and District Electric Supply Co., Ltd.

The annual meeting was held last week, Mr. A. H. Beatty, O.B.E. (chairman), presiding. In moving the adoption of the report and accounts, the chairman said that the year had started well, and had showed promise of increasing the earnings until the time of the general strike and the prolonged coal stoppage, which had resulted in an almost total cessation of work at the collieries and industrial works in South Wales for nearly nine months. Under the circumstances an account showing a trading profit of £30,548 was not an unsatisfactory result. The company's revenue was chiefly derived from electricity supply, and although the number of consumers had increased from 1,920 in 1924 to 2,730 in the year under review, the actual energy sold had decreased by over 3,000,000 kWh, as compared with the year 1924-25. On the traction side the number of passengers had decreased by over 500,000. The electricity supply business continued to show satisfactory progress, and the 5,000-kW set installed two years ago would shortly be fully loaded. Application had been made to the Electricity Commissioners for permission to install another 5,000-kW set.

St. James' and Pall Mall Electric Light Co., Ltd.

The report for 1926 shows a net profit of £75,573. An interim dividend at the rate of 10 per cent. was paid on 40,000 £5 ordinary shares, and it is now proposed to pay a final dividend of 1s. 3.3d. per share on 640,000 £1 ordinary shares, making up the standard dividend fixed in the London Electricity (No. 2) Act, 1925. A balance of £17,773 remains to be carried forward. The report records the death of Mr. Walter Leaf, the chairman of the company, and the appointment of Mr. C. P. Sparks to the board in June last. The extension of the company's tenure granted by the above-mentioned Act rendered unnecessary the retention of the sinking fund established under an agreement with the London Electric Supply Corporation, Ltd., and the fund has accordingly been divided between the companies. Meeting: April 5th.

Folkestone Electricity Supply Co., Ltd.

The accounts for the past year show a profit of £39,176, to which is added £1,499 brought forward, making £40,675. After meeting debenture interest, preference dividend, &c., it is proposed to allocate £9,013 to depreciation, £7,000 to the reserve fund, and £5,000 to the employés' superannuation fund. A final dividend of 6 per cent., free of tax (making 10 per cent. for the year, tax free) is recommended on the ordinary shares, leaving £1,498 to be carried forward. The whole of the £10,000 employés' co-partnership shares have now been allotted. It is proposed to offer to existing shareholders (at par) 40,000 new ordinary shares in the proportion of two new shares to every five at present held.

Salisbury Electric Light and Supply Co., Ltd.

The annual meeting was held on March 15th. Mr. C. J. Woodrow (chairman) presided, and presented the report for 1926, which showed a balance of £8,084. The directors recommended a final dividend of 6 per cent., free of tax, making 10 per cent. for the year. £100 was transferred to reserve, and £184 carried forward. The chairman said that the installation of the new boilers and generating plant, with the necessary buildings, had been delayed by the coal dispute, but the work was now nearing completion. Mr. F. E. Gripper had retired from the board owing to ill-health, and the vacancy had been filled by the appointment of Mr. C. H. Jones.

Oxford Electric Supply Co., Ltd.

With a balance of £2,075 brought forward, the amount available in respect of the past year is £50,120. After meeting debenture and other charges, a dividend of 7 per cent. is declared on the ordinary shares, of which 2½ per cent. has already been paid, leaving £32,289 to be carried forward. The report states that the directors have again been obliged to incur heavy capital expenditure to meet the growing demand. Negotiations are in progress with the City Council for the suspension of its purchase option for a period of 42 years from 1932. This, it is stated, would enable the company to reduce its charges and raise necessary capital for extensions. It is hoped that a satisfactory result will shortly be reached.

Clyde Valley Electrical Power Co.

The directors' report for 1926 shows a balance of profit of £226,700, to which is added £67,424 brought forward, making £294,124. After meeting the preference dividends and transferring £90,000 to the contingency fund, it is proposed to pay a final dividend of 5 per cent. on the ordinary capital (making 8 per cent. for the year) and to carry forward £50,124. The construction work at the Falls of Clyde has proceeded during the year, and it is expected that the plant will be in operation in time for the winter demand. During the period the company's supply was extended to Bridge of Weir, Carluke, Helensburgh, Kirkintilloch, Lanark, and Vale of Leven. The undertaking of the Kilmalcolm Electric Lighting Co., Ltd., the share capital of which is owned by the company, has been completely reorganised. The old steam generating station has been closed down and a full supply for all purposes is being given at more favourable rates. Meeting: Glasgow, March 30th.

Waygood-Otis, Ltd.

The annual meeting was held on March 16th. The chairman, Mr. Henry C. Walker, who presided, said that during the past year several important contracts had been completed, notably those in connection with the Morden extension of the Underground Railway. The extensions and alterations to their works were nearing completion, and they now had a factory second to none in London. He was pleased to say that, with the rare exceptions of calling upon the Otis Elevator Company, of New York, as they had power to do, all their lifts were British built with British labour and materials.

Waste Heat and Gas Electrical Generating Stations, Ltd.

The report for the past year shows a net profit of £24,024, as compared with £27,019 in 1925. To this is added a net amount of £14,272 brought forward, making £38,296. The directors recommend a dividend of 8 per cent. for the year, of which 1½ per cent. has already been paid, leaving a balance of £12,696 to be carried forward. The dividend for 1925 was the same. The output from the company's stations was considerably reduced; they were closed down from May to December, but all but one are now in operation. Meeting: To-day (Friday).

Windsor Electrical Installation Co., Ltd.

The profit for the past year (including £5,765 brought forward) is £11,910. From this £4,000 is transferred to depreciation, renewal and reserve fund. A final dividend of 6 per cent. is declared (making 10 per cent. for the year), together with a bonus of 4 per cent. This leaves £6,310 to be carried forward. The directors propose to capitalise £25,000 of the reserve and issue it to existing shareholders in the form of 7 per cent. cumulative preference shares of £1 each, without payment, in the ratio of one new share to each two at present held. The new shares will rank for dividend as from January 1st, 1927.

Woking Electric Supply Co., Ltd.

The balance on the past year's working is £33,750, and with an amount of £1,729 brought forward there is available £35,479. After meeting debenture interest, preference dividends, &c., £8,000 is allotted to depreciation and renewals, £5,000 to reserve, and £5,000 to change-over account. A dividend on the ordinary shares of 10 per cent., free of tax, is to be paid, and £1,474 is carried forward. The revenue increased from £60,701 to £67,143. The death of Mr. H. W. Bowden (a director) is recorded, and the report states that his son, Mr. A. H. Bowden, has been appointed to the board.

Slough and Datchet Electric Supply Co., Ltd.

The profit for 1926 (including £6,163 brought forward) is £20,662. This is allocated as follows:—Depreciation, renewal and reserve fund, £5,500; directors' fees and tax, £1,000; a final dividend of 6 per cent. (making 10 per cent. for the year), together with a bonus of 4 per cent., leaving £5,762 to be carried forward. It is proposed to increase the capital by £50,000 (to £125,000) in ordinary or preference shares. During the year £17,231 was spent on capital account, the chief item being mains, £11,735.

British Aluminium Co., Ltd.

The profit for the past year, including the balance brought forward, was £304,644. From this £50,000 is put to depreciation reserve, £100,000 to general reserve (making £650,000), and £10,000 to staff benefit fund, leaving £144,644. After paying the preference dividend and a final dividend of 6 per cent. (making 10 per cent.), a balance of £26,567 is carried forward. For 1925, in addition to the same dividend, a bonus of 2½ per cent. was distributed.

Ericsson Telephones, Ltd.

The report for the past year records a reduction in the net profit from £66,174 to £44,599, after meeting taxation, debenture interest, depreciation, &c. A balance of £22,259 is brought forward, making £66,858. It is proposed to write off £6,475, stamp fees on new capital, to transfer £15,000 to general reserve (against £65,000), and to pay a dividend of 8 per cent. on the ordinary shares, leaving £22,217 to be carried forward. Meeting: March 30th.

British Insulated Cables, Ltd.

The annual meeting was held on March 21st, Sir Arthur Stanley, G.B.E., presiding in the absence, through ill-health, of the chairman, Mr. J. Taylor. After referring, with regret, to the death of Sir J. S. Harmood-Banner (vice-chairman), Sir Arthur said that the past year had been a good one for the company, although the profits had decreased as compared with the record attained in 1925. The investments had been increased by £129,812 to £780,165, and a recent valuation showed them to be considerably above the balance-sheet figure. Owing to the general strike, the works were closed down for nearly a fortnight, which, of course, combined with the coal dispute, had an adverse affect upon the year's trading. He hoped that henceforward harmony would exist between the company and its employés. The profit-sharing scheme which had been in operation for many years had been fully justified. The company had recently secured, in the face of keen competition, an order valued at about £700,000 for the electrical equipment (overhead system) of the main line of the Great Indian Peninsula Railway; a large contract for the equipment of the suburban lines of that railway had already been carried out. The Cable Makers' Association had secured a high grade of quality in the products of its members, and had standardised British cables. Its work had been of great value. Now a serious attempt was being made to bring certain companies, including the British Insulated, into closer contact. These companies would collaborate more completely than in the past and, although remaining autonomous, would work together in such a way as to ensure, as far as possible, a community of interests. Information would be interchanged upon the subjects of manufacturing processes and costs, the purchasing of raw materials, and research. Each company was already spending large sums upon research; co-ordination of effort would result in the saving of expense and better results. The principal object of that closer association was the lowering of costs in order to meet foreign competition at home and abroad which had recently increased to a large extent. If the negotiations were successful the result would be of benefit not only to the shareholders of the companies, but also to the buyers and users of electric cables; in addition, an increased export trade would mean more employment. The chairman then reviewed the year's accounts, which were dealt with in our issue of March 18th (p. 444), and dealt with the company's investments. Those investments, he said, had been made primarily in the trading interests of the company, and they had been amply justified. British Government and other securities had increased by over £120,000. The Midland Electric Corporation, in which a considerable interest was held, had paid a dividend and bonus of 15 per cent. for 1925, and the same rate was again recommended. The concessions of the Electric Supply Co. of Victoria expired in about four years' time, but negotiations were in hand with the authorities for their extension. The report and accounts were adopted.

Pinchin, Johnson & Co., Ltd.

Speaking at the annual meeting last week, the chairman (Mr. E. Robson) said that the paying of a 30 per cent. dividend during a troubled year was a matter for congratulation. The company was in a strong position, and its strength had enabled it to recover very rapidly from the effects of the general strike. Its success was due to a combination of up-to-date plant, technical skill, and efficient marketing. The directors were asking for authority to create 300,000 new ordinary shares; 240,000 of those were required in connection with the acquisition of the business of Messrs. Docker Bros. The report and accounts were adopted, and subsequently the increasing of the capital was approved.

Yorkshire (West Riding) Electric Tramways Co., Ltd.

The coal dispute had a serious effect upon the company's business, the net income falling from £39,955 in 1925 to £28,875 last year. Adding £574 brought forward, the available balance is £29,449. After paying the preference dividend and reserving £11,103 for renewals, &c., a balance of £4,166 is carried forward. A dividend of 5 per cent. was paid on the ordinary shares for the preceding year.

English Electric Co., Ltd.

There was a deficit of £78,590 for 1926 after crediting £74,098 brought forward. The directors are accordingly unable to pay the balance of the preference dividend. The prospects for the current year are stated to be better, the unexecuted orders brought forward being much in excess of those brought forward from 1925. Meeting: March 30th.

Stock Exchange Notice.

Application has been made to the Committee to allow the following to be officially quoted:—

North Metropolitan Power Station Co., Ltd.—£850,000 5 per cent. guaranteed debenture stock, 1957, and partly-paid scrip.

Tyneside Electrical Development Co., Ltd.

The profit for the past year amounted to £4,064, and to it is added £744 brought forward, making £4,808. It is proposed to pay a dividend of 10 per cent. on the deferred ordinary shares (against 6 per cent. for 1925); to tranafer £500 to general reserve; and carry forward £809.

Chelsea Electricity Supply Co., Ltd.

A final dividend of £6 1s. 3d. per cent. has been declared on the ordinary shares (1s. 2.55d. per share). This with the interim dividend of 4½ per cent., makes up the standard rate for the year.

Brompton and Kensington Electricity Supply Co., Ltd.

It is proposed to pay a final ordinary dividend of 10.7d. per share; this, with interim distribution of 5 per cent., makes up the standard dividend for the year.

Eastern Extension, Australasia and China Telegraph Co., Ltd.

The directors have declared a final dividend of 5s. per share, free of tax.

Eastern Telegraph Co., Ltd.

The directors have declared a final dividend of 2½ per cent., free of tax, on the ordinary stock, making 10 per cent. for the year, as in 1925.

Rangoon Electric Tramway and Supply Co., Ltd.

A final dividend of 1 rupee 4 annas per share is recommended on the old ordinary shares, and a dividend of 14 annas per share on the new shares.

Thos. W. Ward, Ltd.

An interim ordinary dividend of 2½ per cent., free of tax (as in 1926), has been declared.

Kensington and Knightsbridge Electric Lighting Co., Ltd.

The directors recommend a balance dividend of 1s. 3d. per share on the ordinary shares.

Anglo-Portuguese Telephone Co., Ltd.

A final dividend of 4 per cent. is recommended, making 7 per cent. for the year.

Mid-Cheshire Electricity Supply Co., Ltd.

A dividend of 3½ per cent. has been declared on the ordinary shares out of a net profit of £7,436.

Metropolitan-Vickers Electrical Co., Ltd.

The directors have again declared a dividend of 8 per cent. upon the ordinary shares.

Alley & McLellan, Ltd.

The directors are unable to declare a dividend on the ordinary shares for the past year.

Stocks and Shares.

MONDAY EVENING.

THE Stock Exchange financial year ends with March 25th, and it cannot be said that the House is concluding its fiscal twelvemonth in a particularly happy frame of mind. There seems to be a lot of stock about for which a permanent home is wanted, its present holders not being sufficiently ready, or strong enough, to keep it. Nevertheless, the purely investment markets are tolerably firm. The industrial sections are held back by uncertainties as to what may be proposed in the Budget. The news from China is a depressing factor. The Balkans appear to be getting busy again.

The Marconi meeting is now ancient history. The decisive majority given to the directors by the shareholders in support of the board's scheme is evidence of a desire to let the dead past bury its dead and to allow the company to go ahead under reorganised conditions of capital such as will bring within sight the early payment of a dividend. Now that the heat, the dust, and the acrimony have died away, the company can settle down to business. Expectation canvasses the possibility of a 10 per cent. dividend on the 10s. shares, to be declared, it may be, within the next few months. If it be complained that a 10 per cent. dividend would give a very modest yield on the present price of 17s. 6d., namely, 5¼ per cent., the answer is that this rate ought to be increased as the company gets fairly into its stride.

The Metropolitan Electric Supply Company provided a pleasant surprise by declaring a final dividend at the rate of 12 per cent., on the whole of the ordinary share capital, making 8 per cent. for the year. This is equal to 12 per cent. on the old capital, an increase of 1 per cent. over the 1925 dividend. The market had not expected any change, and the price of "Mets." rose 2s. to 27s. Like the County of London Electric Supply Company, the Metropolitan has a wider area than that over which the other London undertakings work, and this consideration is regarded as justifying a hope of higher dividends, after 1931, than the 7 per cent. standard rate laid down in the Act.

London Electrics have improved to 24s. 6d. on announcement of a final dividend, which makes £8 8s. 7d. per cent. for 1926 on the present ordinary share capital. Last year the dividend was 10 per cent. on the smaller capital. Prices of other shares in the London group are firm. Kensingtons have strengthened to 25s. 6d.

The provincial electric supply shares are hard, on the atten-

tion being paid to them as offering more scope than the London list does. Had it not been for the effects of the coal stoppage, the companies would undoubtedly have done very well in 1926. As it is, the general result must be accounted good in the circumstances. The Clyde Valley pays 5 per cent. final, making 8 per cent. for the year, the same as before: the profits are, naturally, lower. Midland Counties are mounting quietly, and have more than recovered the dividend taken off the price a fortnight ago. Lancashire Electrics advanced to 25s. 6d. Folkestone Electrics at 43s. 9d. are nearly ¼ up.

The Yorkshire (West Riding) Electric Tramways, as already announced, has passed its dividend for 1926, against 5 per cent. paid for 1925. The report points out that the company operates in the heart of the West Yorkshire coalfield, and, consequently, the full effect of the miners' strike was experienced. The shares are quoted at about 8s. 9d. On the other hand, Yorkshire Electric Power are a good market at 29s. 6d.

Tube stocks yielded part of their recent strength, because Lord Ashfield's speech at the meeting of the Underground Electric Railways of London was less definite than had been expected on the subject of traffic restriction. It would appear as though a good deal of work has yet to be done before anything like a cut-and-dried scheme can be formulated in regard to the division of competition. His Lordship dealt with the efforts that the Board is making for repayment of the 6 per cent. tax free income bonds. If these could be extinguished, by redemption, and replaced by some less expensive form of security, the £1 ordinary shares would stand a better chance, and it is this factor that maintains the shares at their present price. There are very few dividend-paying shares which offer so low a current yield as £1 18s. 9d. per cent. on the money. The reduction in the price of petrol is expected to benefit the company to some extent.

Reference was made last week to the dividends of 10 per cent. declared upon Automatic Telephones, and International Automatic Telephone ordinary and deferred. Hopefulness has looked for more, in the case of the last two, but prices are maintained, Internationals being 43s. and 41s. 3d. for the ordinary and deferred respectively. The company's report shows an advanced profit, though the improvement is less sensational than that of a year ago. The American house which held the controlling interest, Messrs. Theodore Gary & Co., have offered to cancel their original option to buy 170,000 International Telephone preference at 21s. 6d., exchanging for this the right to subscribe, also at 21s. 6d., for an equal number of new preference shares to be created for that purpose.

Telephone Manufacturing shares are dull, and the price has sagged to 6s. 9d. There seems to be no resistance offered to a long stream of small sellers. The American Telephone and Telegraph Company publishes a remarkable report showing net earnings for last year of 137 million dollars, out of which dividends totalling 86½ million dollars have been paid. The company had, at the end of last year, 399,121 stockholders, the average holding of whom was 26½ shares. Its capital is 1,077 million dollars; it owns 17¼ million telephones. A touch of human interest is added to the report by the statement that although the telephone is one of the greatest inventions of the age, the inventor, and the original backers, never made a great fortune from it. There have not been many telephone fortunes, the directors remark, though they might have added that shareholders in their own company have done extremely well out of original investment in its stock.

British Aluminium have had rather a sharp drop, to 45s., upon the dividend announcement, making 10 per cent., against 12½ per cent. a year ago. Of the latter, 2½ per cent. was declared specifically as bonus, but the price had been raised to a level at which 10 per cent. offers a very meagre return, and it promptly shed half a crown. English Electrics fell further, to 10s. 6d. General Electrics shed the ninepence they gained last week. Siemens have fallen 1/16 to 27s. 6d.

Declines are marked against Enfield ordinary at 3¼, Metropolitan-Vickers, Johnson & Phillips, and British Thomson-Houston preference at 22s. 3d. British Electric Transformer preference rose to 18s. 9d. on the report. All the arrears are now cleared off, and a 5 per cent. payment on the ordinary shares is declared. The company made a net profit last year of £63,200 on its issued share capital of £625,000, of which £300,000 is in preference and £325,000 in ordinary shares, all of £1 each.

The Newcastle-on-Tyne Electric Supply Company was expected to do poorly in 1926, and the reduction of the dividend to 5 per cent., after 7 per cent. in 1925, has aroused no surprise. The profits are substantially down, but the report is not at all a bad one, and the drop in profits should prove to be no more than temporary. Ericsson Telephones pays 8 per cent. on the ordinary, the profits being a good deal lower than those of 1925. In the foreign tramways group, Brazilian Tractions have gone back 3¼ after their pyrotechnical jump. Mexican Utilities are mostly higher, and the market in them continues very hard. British Columbia Electric Railway stocks have further rallied. Rumours that are as yet too irresponsible for repetition serve to keep up the prices of Anglo-Argentine Tramways. The company's traffics are fair, and nothing has been heard of late concerning the threatened opposition from a "Tube" in Buenos Ayres. These two factors may have encouraged the support that has raised both preference issues to 3¼.

Babcocks at 52s. 6d. have not changed, but iron and steel shares are lower as a whole. The rubber market is tame and rather uninteresting; the produce is steady: business in the share market has become quiescent.

Share List of Electrical Companies.

	Num.	Dividend. 1924.	Dividend. 1925.	Price Mar.21 1927.	Rise or fall.	Yield p.c.
Home Electricity Companies.	£					
Bournemouth and Poole	1	14	14	60/9	—	4 12 0
Brompton Ordinary	1	10	10	23/-	—	5 13 0
Charing Cross Ordinary	1	15	15	25/6	—	5 9 10
do. do. ½ Pref.	1	4½	4½	17/-	—	5 6 6
Chelsea	1	12	12	25/-	—	5 12 0
City of London	1	15	15	2⅞	—	... ...
do. do. 6% Pref.	1	6	6	23/-	—	5 4 4
Clyde Valley	1	8	8	20/-	—	5 6 8
County of London	1	15	15	28/-	+3/-	5 0 0
do. do. 6% Pref.	1	6	6	23/-	—	5 4 4
Edmundson's Ordinary	1	7	8	28/3	—	6 2 0
do. 7% Pref.	1	6	7	23/-	—	6 1 9
Elec. Supply Corporation	1	10	10	30/6	—	6 11 9
Kensington Ordinary	1	15	15	25/6	+1/-	5 9 10
Lancs. Light and Power	1	7½	7½	25 6	+6d	5 17 8
London Electric	1	10	10 2	24/6	+6d	5 14 3
do. do. 5% Pref.	5	6	6	5⅞	—	5 10 4
Metropolitan	1	11	11	27/-	+2/-	5 3 8
do. 4½% Pref.	1	4½	4½	17/-	—	5 3 10
Midland Counties	1	5½	6	22/6	+6d	5 6 8
Newcastle-on-Tyne Ordinary	1	7	7	22/-	—	4 10 9
do. 5% Pref.	1	5	5	17/6	—	5 14 3
do. 7% Pref.	1	7	7	24/-	—	5 16 8
Notting Hill 6% Pref.	10	6	6	10	—	6 0 0
North Met. Elec. 6% Pref.	1	6	6	22/-	—	5 9 1
St. James' and Pall Mall	5	17½	17½	25/6	—	5 9 10
South London	1	15	15	24/6	—	6 3 0
South Metropolitan Pref.	1	7	7	1¼	—	6 8 8
Urban Ordinary	1	4	7	25/6	—	5 9 10
do. 6 % Pref.	1	6	6	20/6	—	5 17 1
Westminster Ordinary	1	15	15	25/6	—	5 13 0
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	20/6	—	7 6 4
Yorkshire Elec.	1	8	8	29/6	—	5 8 4
Home Rails.						
Central London Ord. Assented	Stock	4	4	70	—	5 14 4
Metropolitan	,,	5	5	68	—1	4 15 3
do. District	,,	8½	8½	59	—2	5 18 8
Underground Electric	£1	Nil	Nil	15/6	—1/-	1 18 9
do. do. Income	Bonds	6	6	101	—	*5 18 10
Telegraphs and Telephones.						
Anglo-Am. Tel. Pref.	Stock	6	6	100	—	6 0 0
do. Def.	,,	1½	1½	23½	—	6 6 0
Automatic Telephone	1	8	10	53/3	—	8 15 0
Chili Telephone	5	5	6	6½	—	4 12 4
Cuba Sub. Ord.	10	5	5	7	+½	7 2 10
Eastern Extension	10	10	10	17⅝	—	*5 13 4
Eastern Tel. Ord.	Stock	10	10	172½	—	*5 16 0
Globe Tel. and T. Ord.	10	10	10	18½	—	*5 8 1
do. do. Pref.	10	6	6	11	—	5 9 1
Great Northern Tel.	10	22	20	26¾	—	7 10 0
Indo-European	25	8½	10	46½	—	*5 7 6
Marconi	1	10	Nil	17/6	+1/-	... ..
Marconi-Marine	1	10	7½	23/3	—	6 9 0
Oriental Telephone Ord.	1	12	12	53/3	—	*4 12 0
United R. Plate Tel.	5	8	8	8¾	—	*4 11 5
Western Telegraph	10	10	10	17	—	*5 17 8
Home and Foreign Trams, &c.						
Anglo-Arg. Trams First Pref.	5	5½	5½	8½	—	8 9 2
do. do. 2nd Pref.	5	6	6	8½	—	9 4 8
do. do. 5% Deb.	Stock	5	5	71½	—	7 0 0
British Electric Traction Ord.	,,	7	8	144½	—1	5 10 9
do. do. 6% Pref.	,,	6	6	109	—	5 10 1
Brazil Traction	100	4	5	128½	—3½	4 13 4
Brit. Columbia Elec. Rly. Pcc.	Stock	5	5	89½	—	5 11 9
do. do. Preferred	,,	9/6	10/9	117½	+1	*5 6 5
do. do. Deferred	,,	12/6	8	159	+1	*5 0 8
do. do. Deb.	,,	4½	4½	79½	—	5 7 0
London & Sub. Trac. 5% Pref.	1	2½	Nil	7/3	+3d	Nil
London United Tram. Deb.	Stock	4	4	51	—	7 16 10
Mexico Trams, 5% Bonds	—	5	5	21½	—	6 18 0
Mexican Light Common	100	Nil	Nil	46	+1	Nil
do. Pref.	100	Nil	Nil	97½	—	Nil
do. 1st Bonds	—	5	5	71½	+1	6 19 10
Yorkshire (West Riding)	1	8	—	8/9	—	... ..
Manufacturing Companies.						
Babcock & Wilcox	1	12	18	52/6	—	4 19 1
British Aluminium Ord.	1	5	10	45/-	—2/6	4 9 5
British Elec. Transformer Pref.	1	Nil	7	18/9	+6d	7 9 0
British Insulated Ord.	1	15	15	68/9	—	4 7 3
Brush Ord.	1	10	10	28/3	—	7 1 7
Callenders	1	15	15	3½	—	4 5 9
do. 6½% Pref.	1	6½	6½	23/9	—	5 9 8
Crompton Ord.	1	Nil	Nil	10/-	—	... ...
Edison-Swan	£/-	10	10	10/-	—	4 0 0
do. 5% Deb.	Stock	5	5	85	—	5 17 8
Electric Construction	1	10	10	81/3	—	5 8 6
Enfield Cable Pref.	1	7½	7½	1½	—	6 6 4
English Electric	1	5	Nil	10/-	—1/3	... ...
do. do. Pref.	1	6	6	13/6	—	... ...
Gen. Elec. Pref.	1	6½	6½	23/6	—	5 10 8
do. Ord.	1	5	7½	£0 6	—9d	4 18 4
Henley	1	16	20	89/3	—	4 9 8
do. 4½% Pref.	5	4½	4½	4½	—	5 6 0
India-Rubber	1	5	5	1	—	*5 0 0
Johnson & Phillips	1	10	17½	2⅜	—⅛	6 13 4
Met.-Vickers Ord.	1	8	8	28/9	— 6d	5 11 4
do. Pref.	2	8	8	2⅞	—	6 18 4
Siemens Ord.	1	7½	7½	27/6	—1/8	5 9 1
Telegraph Construction	12	20	10	29½	—	*4 0 8

* Dividends paid free of Income Tax.

Our Foreign Electrical Trade.

Electrical Exports and Imports during February, 1927.

IN studying the foreign trade figures for February and noting decreases in both exports and imports, it should be remembered that the month was three days shorter than its predecessor which, naturally, makes an appreciable difference. Moreover, in the case of the exports, the influence of the submarine cable item once again made itself felt by falling to the extent of £179,000—more than accounting for the fall in the total. The other items in the export list, as a whole, showed a rise of about £16,000, increases and decreases being about equal in number. There was a net fall of £11,000 in the machinery class, although unenumerated machinery showed the largest increase. Comparison with the February, 1926, figures shows that, in spite of the equal length of the months and the fact that submarine cable exports were higher, the total fell by over £31,000. Four items show substantial decreases, *viz.*, insulated wires and cables, "other" motors and generators, non-submarine telegraph wires and cables, and telegraph and telephone apparatus. Against these are set large rises in unenumerated goods and apparatus, unenumerated machinery and submarine cables. The exports for the first two months of the year still make a good showing in comparison with the corresponding period of 1926.

The proportional decrease in imports was greater than the fall in exports, and there was actually only one increase as compared with January—in arc lamps and parts. The two unenumerated classes showed very large declines, amounting to about 25 per cent. in each case. On the other hand, compared with February, 1926, increases were general, there being only two decreases. The result was a rise of nearly £56,000 in the total.

The re-exports, which have shown a falling tendency for a few months, revived a little and were higher than in the preceding month and February, 1926.

The following table shows the distribution of our electrical machinery exports last month and in February, 1926:—

Destination.	Feb., 1926. £	Feb., 1927. £	Inc. or dec. £
European countries	71,057	85,045	+13,988
Japan	13,384	27,979	+14,595
South America ...	48,354	34,609	−13,745
South Africa ...	81,633	131,530	+49,907
British India ...	151,874	94,348	−57,526
Australia	117,618	91,148	−26,470
New Zealand ...	37,255	47,771	+10,516
Canada	19,357	14,866	− 4,491
Other countries ...	50,526	54,987	+ 4,461
Totals ...	£591,048	£582,283	−£8,765

	Exports.			Imports.			Re-Exports.		
	Electrical exports for Feb., 1927.	Inc. or dec. as compared with Jan., 1927.	Inc. or dec. as compared with Feb., 1926.	Electrical imports for Feb., 1927.	Inc. or dec. as compared with Jan., 1927.	Inc. or dec. as compared with Feb., 1926.	Electrical re-exports for Feb., 1927.	Inc. or dec. as compared with Jan., 1927.	Inc. or dec. as compared with Feb., 1926.
Electrical goods and apparatus (unenumerated)	£210,650	+ £23, 75	+ £51,676	£86 858	−£28,384	+ £7.230	£5.650	− £317	+£1,080
Insulated wires and cables ...	307 319	+ 32.744	− 33,204	52,123	− 8 465	+ 7,412	222	− 1,485	− 434
Glow lamps	38.913	− 4,184	+ 5,761	24 561	− 11,370	+ 8,001	2,091	+ 1,144	− 480
Arc lamps and parts	2,795	+ 1,346	+ 1.583	2,797	+ 831	+ 2,682	56	+ 44	+ 35
Batteries and accumulators ...	101.066	+ 12.685	+ 142	33 597	− 13 592	+ 6,589	411	+ 51	− 249
Meters and instruments ...	26,094	− 5,615	− 3.310	16,210	− 5,888	+ 2,414	414	− 184	− 970
Carbons	813	− 226	− 868	5.671	− 1,146	+ 516	25	− 29	− 61
Electrical Machinery—									
Electrical machinery (unenumerated)	349 167	+ 44,311	+ 10.753	97,885	− 32 259	+ 45 851	7,952	+ 1,363	+ 3,233
Railway and tramway motors	47 627	− 52,2 0	+ 559	—	—	—	—	—	—
Other motors and generators ..	185,489	− 23,151	− 20.076	—	—	—	—	—	—
Switchboards (not telegraph or telephone)	7,671	+ 3.316	+ 2.771	9	− 558	+ 3	—	—	− 30
Telegraph and Telephone Cable and Material—									
Telegraph and telephone wires and cable (not submarine)	45.027	− 8,531	− 16 803	5,172	− 4,555	− 11,124	239	+ 199	+ 210
Submarine telegraph and telephone cable...	24.491	− 178,995	+ 20,442	—	—	—	—	—	—
Telegraph and telephone instruments and apparatus ...	2 0.243	− 7,568	− 39,080	34,872	− 12,749	− 13,595	5,355	+ 2,875	+ 141
Totals	£1,547,365	−£162 891	− £31,177	£360,055	−£118,045	+ £55,979	£22,415	+ £3,661	+£2,478
Increases and decreases for two months of 1927 ...		EXPORTS: + £315,755			IMPORTS: + £96,885			RE-EXPORTS: − £575	

German Locomotives for Australia.

The Melbourne *Herald* reports that in justification of its decision to buy electric locomotives in Germany, the Victorian Electricity Commission states that tenders were publicly called for three electric locomotives. Only four tenders were received, three being on behalf of German firms, and one from America. No tenders were submitted for the supply of plant of British or Australian manufacture. The lowest tender, that of the Siemens Schuckertwerke Co., of Berlin, was accepted through its agents, Gollin & Co., Ltd., of Melbourne. The Commission's action was endorsed by the Government. The general secretary of the Australian Association of British Manufacturers and their Representatives states, however, that under the guidance of German experts the Commission adopted German standards and, in addition to this, the time allowed was too short to enable British manufacturers to send in tenders.

Australian Ratepayers against American Engines.

The Melbourne *Age* reports that a meeting of the ratepayers of St. Arnaud (Victoria) recently passed a resolution protesting against the local Council's proposal to accept an American tender for a crude-oil engine for the electricity works. It was stated that three British tenders were received, all of them being lower than the American offer, and providing for an engine of greater power.

The British Electrical Development Association.

Annual Dinner.

THE annual dinner of the British Electrical Development Association was held at the Savoy Hotel, London, on March 17th. Sir James Devonshire, K.B.E., who had been elected president of the Association at the annual meeting the same day, occupied the chair; he was supported by a number of distinguished guests.

After the loyal toast, Dr. S. Z. de Ferranti rose to propose the toast of "Co-operative Publicity." He said that the Association's business was to advertise, in a general way, the benefits of electricity to the people. There were many kinds of advertising, from the direct propaganda of the producer to the more subtle methods of the professional man. To-day, advertising was absolutely essential; he was himself advertising his works by speaking that evening. The advertising of E.D.A. was, however, on a higher plane. It marshalled the resources of the industry to bring to the public notice the advantages of electricity; it was a work of education and of national importance. Much as E.D.A. had done, more remained to be accomplished. He thought that manufacturers were not spending enough on co-operative publicity; they should contribute more, even if it meant less individual advertising. The electrical industry was at a turning point. The Electricity Act was now an established fact, and he considered that the Government had done wisely in endeavouring to standardise electricity supply. Wishing the new Central Electricity Board success, Dr. Ferranti said that Sir Andrew Duncan had the great responsibility of bringing the various interests into harmony. It was E.D.A.'s task to educate the people and create the demand. Standardisation would involve great cost, but it would be justified by the benefits which it would bring.

The toast was responded to by the Rt. Hon. C. A. McCurdy, P.C., K.C. (President of the Advertising Association), who said that after examining the whole of E.D.A.'s publicity matter he considered it admirable; he had never seen more effective propaganda. He was greatly impressed by a statement in one of the pamphlets that of seven million houses within reach of electricity supply only 1,400,000 were wired. The experience of other industries proved that such a position could be greatly changed. A very few years ago it was found that the consumption of milk per head in this country was much below that of many other countries. The milk supply industry entered upon an intensive co-operative publicity campaign, with the result that the sales of milk rose to a remarkable extent. Another example was presented by the gas industry, which, by means of co-operative propaganda, had made immense strides in spite of electrical competition. The Indian tea industry had also benefited by that form of co-operation; it had even extended its Indian market. Direct advertising by individuals aimed at getting somebody else's customers; the most fruitful advertising was that which sought to create *additional* customers. The experiences of such dissimilar industries as milk, gas, and tea were striking evidence of the success of that method. All commerce consisted of the exchange of goods. Whatever mistakes were made by statesmen or business men, man would continue to progress, and the exchange of commodities would continue to expand. Although that growth was inevitable it could be quickened by co-operative publicity, and no efforts in that direction would be wasted.

Sir Henry Fowler, K.B.E. (President of the Institution of Mechanical Engineers), proposed the toast of "The Public Service of Electricity." Public service, he said, was the highest ideal of a community or an individual. Electricity was rendering the greatest public service by giving the people light, heat, and power. It would, however, perform far greater services, if it were cheapened. He hoped that the mass production of electricity would lower its price to enable it to go ahead at a greater rate. Coupling with the toast the names of Ald. W. Walker and Mr. W. B. Woodhouse, he said that the former had done good work for Manchester, and was to do more for the community at large as a member of the Central Electricity Board; Mr. Woodhouse had performed great service to the supply industry and the Institution of Electrical Engineers.

In responding to the toast, Ald. Walker said that during the past year, when industry was in a very bad state, electricity had continued to advance. That was due to the growth of the domestic demand, the credit for which was due to E.D.A. For years the electricity supply undertakings had attempted to develop a domestic load individually, but with small success. Now electricity had become a fashion, and that would stimulate the industry in a remarkable manner. Electricity now entered into every minute of the life of the community and the individual; it had even become the nation's principal medium of entertainment. The Association was continually opening up business in new directions, and it did so very cheaply. Referring to the cost of electricity, the speaker said that high prices were generally the result of difficult conditions which the Electricity Act should help to remove. He had no doubt that the Act would eventually lead to a lower average price. In conclusion, he urged electricity supply authorities to set aside more of their profits for the work of E.D.A.—which would result in more profits.

Mr. Woodhouse (Yorkshire Electric Power Co.), who also replied, said that many present had seen the electricity supply industry proceed from poverty to prosperity. The fact that the industry had attracted the attention of all political bodies was a sufficient indication of its present importance. Such distinguished patronage was a compliment to their abilities—not the result of their backwardness. The industry should proceed with caution and commonsense, making sure that every step was a sound one. For that purpose they must depend upon themselves and not rely on political patrons. Rapid progress must leave room for individuality and differences of opinion. He appealed for a free hand for private enterprise. The inception of the industry was due to private enterprise, and in that connection he mentioned the splendid pioneer work of Dr. Ferranti. Through E.D.A. all parties could co-operate in developing the demand; all those in the industry must pursue the ideal of cheap electricity and public service, and they would reap a just reward. The Industrial Councils of the industry (for which Ald. Walker had done a great deal) had taught masters and men to pull together; the companies and the municipalities should profit by their example and co-operate for the public good.

Sir James Devonshire then proposed the toast "Our Guests," stating that such a banquet would be a dull affair without such distinguished guests. He congratulated Dr. Ferranti upon his coming election as a Fellow of the Royal Society, and considered that the Royal Society was to be congratulated as well. He expressed the pleasure of the company at the presence of so many members of the Electricity Board and representatives of the Electricity Commission. He was not yet quite sure of their respective positions. On one page of the new Act the Board was top dog, but on the next it was the bottom dog, and so on. He also referred to the presence of Col. R. E. Crompton and many representatives of municipal authorities.

Sir Andrew Duncan (Chairman of the Central Electricity Board) responded, and said he hoped that if the Board did not meet with the approval of all sections of the industry it would not be barred from their festivities, which appeared to be among the perquisites of the Board. Although the Bill had led to a great deal of controversy, he trusted that the Act would enjoy the hearty co-operation of the whole of the industry. He asked them to feel that the Board was not arbitrary or autocratic. It afforded an opportunity for co-operation, and the work of E.D.A. would supplement and assist the efforts of the Board.

The speeches were followed by an excellent concert provided by Miss Beryl Costello, Mr. Thorpe Bates, the Misses Jacqueline and Joan, Mr. Norman Long, Mr. Cyril Shields, and Mr. Victor Marmont.

The E.D.A. Annual Report.

We have received a copy of the Electrical Development Association's report for 1926, which was presented at the annual meeting last week. This contains a full list of electricity supply members, particulars of sub-committees, &c., as well as a review of the year's activities. Some space is devoted to details of the national campaign. The report is available to any electrical undertaking which cares to make application for it to the Association.

New Electrical Devices, Fittings and Plant.

Readers are invited to submit particulars of new or improved devices and apparatus for publication in this Section.

A Simple Junction Box.

We have received from Messrs. Sefton-Fiddian, Leage and Co., Bush Lane House, Bush Lane, Cannon Street, London, E.C.4, a sample of their patented "Bonfix" junction box which they have recently designed and introduced. It is intended primarily for use in bonding metal sheathed cables used on internal wiring work. It consists of two parts only, the base, which is the essential bonding element, and a suitable cover made to fit over projecting clips on the base, securing slots being provided. Stamped out from the base are four

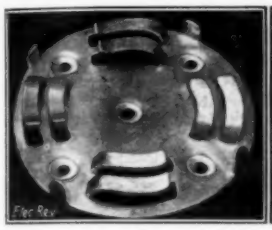


Fig. 1.—"Bonfix" Box Base.

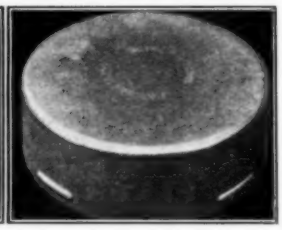


Fig. 2.—The Cover.

double spring clips which accommodate the ends of the cable sheath, and, it is claimed, effect efficient bonding. The base is of heavily tinned brass. The device should prove extremely simple to install, and no screws or other accessories to the box are required. Figs. 1 and 2 show respectively the base and the cover. It will be seen that adequate fixing can be obtained from five different points. The clips are designed to accommodate single, twin, or 3-core flat cables of conductor sizes up to 3/.036. Ample provision is made in the depth of the cover for the use of porcelain connectors. The box can be equally well used in connection with systems employing cab-tire or other sheathed cables for their efficient mechanical security. Provision is made at the back of the base to keep it away from the wall, thereby ensuring against condensation troubles.

An Improved Electric Hair Dryer.

Although designed primarily for the treatment of hair, the new "Ideal" dryer, recently introduced by Messrs. Falk, Stadelmann & Co., Ltd., 83, Farringdon Road, London, E.C.1, is claimed to be suitable for being put to many other uses in the home, including, *e.g.*, therapeutic treatment and photography. The apparatus embodies four improvements, as a result of which distinct advances are claimed on the old models.

Fig. 3.—Driving Unit.

Fig. 4.—Ideal Hair Dryer.

The switches are fitted conveniently in the handle so that they can be manipulated by the thumb of the hand in which the machine is held, leaving the other hand free, fig. 4. The air vane is of a new design with six blades which increases the normal output by nearly 30 per cent. By means of an improved intake the atmospheric noises are greatly reduced. The driving unit, fig. 3, has been greatly simplified, aid is assembled without screws. The dryer is arranged for connection to any ordinary electric lamp holder, and hot or cold air is obtainable by the simple operation of a switch.

A Battery Maintenance Outfit.

A number of special repair outfits for use in connection with battery maintenance have been introduced. Among these is the "Segis" battery outfit, which has lately been put on the market by Messrs. S. Guiterman & Co., Ltd., 35-36, Aldermanbury, London, E.C. The output consists of a full-size hydrometer, a large celluloid funnel with an air vent, four large lead-coated battery clips, a large tin of anti-corrosive battery terminal grease, and an 8-oz. "Testrite" battery filler, all contained in a stout wood case with a hinged cover. The same firm is also handling the "Simplicit" acid pump, which has a conical plug for inserting in the neck of the usual acid carboy, and is operated after the fashion of a pipette scent spray, provision being made for regulating the flow or rate of discharge from the carboy into the battery as required. The whole is constructed of acid-proof materials and is designed to trap the drippings and prevent leakage and waste by overflow. The outfit includes 4 ft. of heavy overflow or delivery tube, and a nozzle end for inserting in the cell openings.

A Feed-Water Impurity Indicator.

The Crockatt Simplex Patent Electric Salinometer, fig. 5, has recently been produced by Messrs. W. Crockatt & Sons, Ltd., 62 and 64, Darnley Street, Glasgow, S.1, for the detection of salt or other impurities in boiler feed water. Its operation is based on the varying conductivity of dilute solutions of electrolytes according to the impurity content, provision being made for the conductivity variation due to changes in temperature. The instrument consists of three essential parts, the detector or electrode cell, the temperature compensator, and the indicating or recording instrument. The detector is

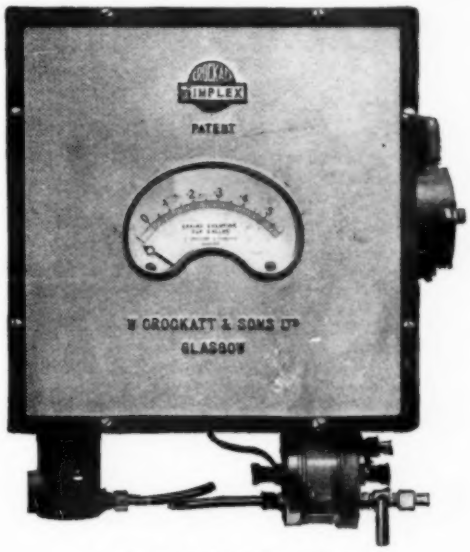


Fig. 5.—Indicating Instrument.

of glass, secured in a gunmetal case, and fitted with platinum electrodes specially designed for obtaining accurate readings. The temperature compensator comprises a gunmetal pocket, containing the thermometer bulb, through which the test water flows on its way to the detector; the rise or fall of the mercury operates a series of contacts which correct the instrument reading for changes of temperature. The indicating instrument, fig. 5, contained in a cast-iron case, is of the moving-coil type, and has a 6-in. dial. A ¼-in. bore copper pipe connects the water system and the thermometer pocket, and from this the water passes through the detector and then to waste or back into the feed system. A watertight switch on the right-hand side of the case provides for the necessary electrical connection.

The instrument is claimed to be extremely sensitive, the standard Admiralty type reading from 0 (pure water) to 0.5 grains of chlorine per gallon, with a temperature range of 80 deg. to 120 deg. Fah.; the usual commercial range is from 0 to 5 grains of salt per gallon. To meet the case where it is desired to take the readings from a number of points, the multi-point instrument has been designed. In this a number of detector cells are used in connection with one indicating instrument only, interlocking change-over switches being fitted so that any cell can be connected to the instrument, and a reading of the salinity taken. Indicating lamps are permanently in circuit to show the presence of salt.

The "Ideal Home" Exhibition.

A Review of the Electrical Features of this year's show at Olympia, London.

(*Concluded from page 455.*)

Standard Telephones & Cables, Ltd.

A very comprehensive range of domestic electrical exhibits is shown on this stand. One appliance which is commanding a great deal of interest is the "Standard" vacuum sweeper. An outstanding feature of this is the "Vac-Mop," an attachment which is specially designed for cleaning polished surfaces. It is arranged so that the cotton duster or mop can be removed at any time for cleaning and replaced. An important point about the sweeper is that all the appliances and tools can be fitted from the front of the machine. The motor is so arranged that there is very little vibration on the handle. The motor switch is in a convenient position on the handle, so that the forefinger of the right hand can manipulate it with ease. Another feature of the exhibit is the "Standard" washing machine. This is of the alternate rotary type, and the clothes are contained in a perforated zinc cylinder, which is put into action by a simple switch. The wringer has rubber-covered rollers, and is capable, it is claimed, of taking a full-sized blanket. The wringer and the clothes washer can be operated simultaneously. The "Standard" ironing machine, fig. 8, is interesting many of Olympia's visitors. A small switch on the right controls the roller and the ironing shoe. In order that the operator may use both hands for guiding the material, a knee switch is provided. An excellent range of domestic table appliances, including coffee percolators, tea infusers and toasters, is also shown.

Fig. 8.—An Electric Ironing Machine.

General Electric Co., Ltd.

This company's stand accommodates probably the largest electrical exhibit in Olympia. It is arranged in two sections, one in full view of the visitors from the main floor, and the other comprising demonstrating rooms which are furnished properly so as to give the desired atmosphere for displaying the electrical apparatus. The general exhibit includes cookers, fires, hair dryers, kettles, suction cleaners, refrigerators, toasters, washers, wringers, and so on, all representing the latest developments of the company. The "Magnet" electric wizard (Electrical Review, February 11th, 1927, p. 211) is attracting a great deal of attention from the public, continuous demonstrations being given of its many uses. Another feature of the apparatus shown on this stand is the "Batchelor's" grill. This neat appliance will, it is claimed, perform most of the cooking requirements of one or two people as effectively as many of the larger types of electric cookers will do them for an average family. The demonstration portion of the exhibit includes a reproduction of a modern bathroom, completely equipped electrically to illustrate how the adoption of the electrical idea conduces to comfort, convenience, and hygiene in this important apartment of the home. Hot water is supplied, both to the bath and wash basin, from an electric calorifier, controlled by a thermostat. Over the wash basin is an electrically heated mirror, and conveniently placed beside this is a wall plug to which a small electric shaving pot may be connected. To add to the personal comfort of the occupier during shaving operations, a novel type of lighting unit over the mirror provides a good light without glare. The main lighting is provided by a central "Superlux" bowl. A towel rail and a bath-gown rail are both electrically heated by means of concealed immersion heaters. The equipment is completed by an electric hair dryer and an electric vibrator. In the company's reception room on the stand, which is designed to represent a modern dining-room, a feature is the artificial sunlighting effect from a full-size window, the exterior of which is equipped with "Osram" lamps. The interior lighting is effected by four specially made inverted wood corner brackets fixed at about a third of the way down the wall, and the result is very pleasing. An all-electric kitchen accommodates the usual G.E.C. apparatus for cooking, washing, cold-storage, and so on.

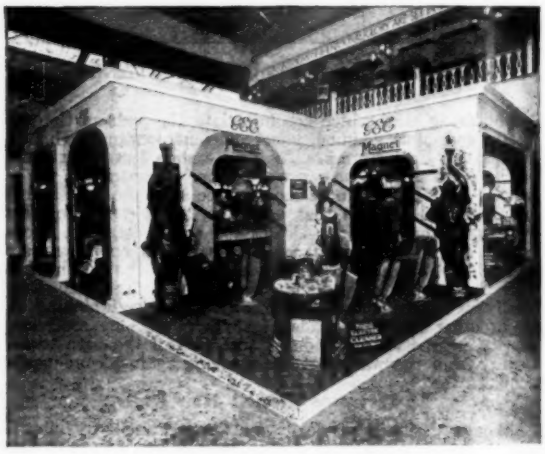


Fig. 9.—G.E.C. Stand at Olympia.

Dignity is given to the general exhibit by the inclusion of two imposing life-size figures in bronze of a Frank and a Saxon—the original Vikings—which were cast many years ago for the Royal Opera House, Paris. Fig. 9 shows these figures; the lamps are, of course, electrical. A point worth mentioning is the roof of the stand, where from the gallery one sees a huge map of Great Britain bordered by the company's trade mark and the words, "The home of quality production" and "Buy goods made in Great Britain."

British Thomson-Houston Co., Ltd.

A very effective and spectacular display is housed on this stand to popularise Mazda lamps. In the foreground, the familiar Mazda clock cut-out, reproduced to a very large scale, is picked out by spotlights while the clock face itself is illuminated from behind. To the rear of this tableau a number of cubicles representing rooms in the home, are equipped with appropriate B.T.-H. fittings for the purpose of demonstrating under actual working conditions the many types and sizes of Mazda lamps, including the latest development—the Pearl Mazda.

Thorn & Hoddle, Ltd.

On this stand is shown a comprehensive range of small electric generating plants, including the "Pelaphone" equipment, in addition to a display of lighting fittings of the exhibitors' own manufacture.

Delco Light Co.

An interesting array of automatic electric lighting plant designed particularly for country houses, in addition to automatic electric pumps and Delco-Light battery sets, is to be seen on this stand.

Telephone Development Association.

This exhibit is laid out to remind the visitor of the advantages of the telephone service. A very interesting feature of the display is the "Burovox" loud-speaking telephone system which has been installed at Scotland Yard and some important business houses and theatres in the country. The system consists of a small microphone, a number of loud speakers, and the necessary master switch, or, if required, the switch can be combined with a loud speaker as one unit. The loud speakers can be hung up in the required compartments or rooms, or they may be obtained in table-stand form. In connection with this exhibit the Association is running a competition. Each visitor to the stand is given a number, and the holder of a winning number drawn each day will be entitled to the first year's rental of a telephone, installed free at any private residence situated within 1½ miles from an existing exchange.

Frigidaire, Ltd.

At this stand may be seen a wide range of Frigidaire apparatus designed to meet the requirements of all commercial interests concerned with the production and preservation of foodstuffs. The equipment includes cabinets in varying models, and display counters, butchers' caterers, and so on.

Electrolux, Ltd.

Varying designs of the "Electrolux" refrigerator are shown at this exhibit, and also the actual refrigerating unit is displayed without its necessary housing or cabinet.

Other Exhibitors.

Among the other electrical exhibitors are Messrs. Freezone, Ltd., who are displaying their home refrigerator and hygienic larder; Hammond Bros. & Champness, Ltd., electric lifts; Duncan Watson & Co., "Apex" and "Rotarex" domestic electrical appliances; Clarkhills, Ltd., electric water heater; Spenser's Silverlite, electrically-driven gas generator; B.I. Syndicate, Ltd., "Astro" reflectors; Mechanical Refrigerator Co., Ltd., automatic electric refrigerators; Sheringham Daylight Co., Ltd., "Sheringham" synthetic daylight lamps; Ransomes, Sims & Jefferies, Ltd., electric lawn mower; British Home & Office Telephone Co., Ltd., intercommunication telephone system; Electric Appliances Co., Ltd., the "Eureka" electric cleaner; A. W. Gamage, Ltd., small electrical domestic appliances; British Vacuum Cleaner & Engineering Co., Ltd., electric vacuum sweepers; Hurley Machine Co., various electrical domestic appliances; Tellus Super Vacuum Cleaner, Ltd., the "Tellus" cleaner; Electrolux, Ltd., refrigerator; A. Delval, the "Laun-dry-ette" electric washing machine; Radio Vacuum Cleaners, Ltd., the "Vacuette"; Betax Mfg. Co., Ltd., small domestic apparatus; S. C. Johnson & Son, Ltd., electric floor polisher; Gen Labor-Saving Device Co., Ltd., the "Ohio" electric vacuum cleaner; and others.

We learn that the fountain court in the main hall, to which we referred in our issue of March 11th, was manufactured by Mr. G. W. Robinson, who also made the electrical fountain on the *Smallholder* stand in the new hall.

What is Electricity?

"When we read that 'In the beginning God created the heavens and the earth' we know, within the limits of human knowledge, that the first thing made was electricity;" protons and electrons are right and left-handed, having the nature of screws, and are suggested to be simply permanent loops on vortex threads of a vortex sponge ether; the vortices are possibly spiral.

By Prof. W. M. THORNTON, O.B.E., D.Sc., D.Eng., M.I.E.E.

(*Résumé of* FARADAY LECTURE *delivered before the* INSTITUTION OF ELECTRICAL ENGINEERS.)

RECENT research has shown that the atoms of the universe are spinning groups of electrical charges, minute planetary systems, each with a mass of positive charge as a nucleus about which electrons of negative charge revolve in orbits, each of which corresponds to a line in the atomic spectrum, visible or invisible.

With slight modifications, Newton's law of gravitation holds for farthest stellar systems of immense magnitude and for the smallest atoms: the telescope tells us that the vast interplanetary regions are empty of matter, which spaces find their counterpart in the hollow interior of the atom, swept clear of intruding electric charges by the outer electrons revolving in their orbits a hundred million million times a second; giving out light, under certain conditions, oscillating at the same high frequency. Light is an electrical phenomenon, visible electrical radiation, requiring an oscillation of electrical charge to produce it, and a receiver (the eye) to observe and record it. Since light of a kind identical with that we can make has been received from atomic vibrations in stars so far distant that it has taken a million years (travelling at a speed of 186,000 miles a second) to reach us, we can infer that the electricity in the most distant parts of the universe is the same as that of which our own world is made.

The Nature of Electricity.

Though the nature of electricity as a dual entity may be still unsolved, we know a good deal about it: it is not in the strict sense material, but a kind of sub-matter. Charges have in their electromagnetic behaviour directly opposite characters and for this reason only can they be said to be opposite in sign. There are nearly 25 billion electrons to the inch; protons are still smaller, but are 1,850 times heavier than electrons. When we ask for a pound of bread, or of butter, or tea, we really ask for a pound of electricity in the form of these commodities. There are known to be 92 possible atomic elements of matter, a few of which have still to be discovered; each of them normally contains equal numbers of positive and negative units of electricity. To account for this equality both must have been made simultaneously by the same act, a definite creation. The electricity in the universe is an incredibly vast store of energy: there is enough energy in one pound weight to raise a hundred million tons of cold water to boiling point, or to give 16,000 million horse-power for one hour. The proof of this statement is one of the most solid achievements of the theory of relativity.

Electricity must be made from the ether, there is nothing else to make it from; since in the formation of the charges work is done, and it can only be by compression, tension, or twist, it is necessary to find which was first used. The ether streams through the earth without resistance, the planets do not appear to be in the least affected by their motion through it: it is therefore impossible to apply force to it by ordinary matter, but it can be twisted by electricity in motion, for around every electric current there is a magnetic field, right-handed about a positive charge, left-handed about a negative charge. A magnetic field is a circulation in the ether resembling a fluid "vortex," and can be shown by discharge in a vacuum tube; spiral nebulæ are also evidence of vast spins, or twists, of the ether so large that in some of them the solar system would be lost.

Their electromagnetic behaviour is the strongest evidence that protons and electrons have the properties of screws, of opposite sign, right- and left-handed, respectively; when the motion stops the twist relaxes, the magnetic field ceases. The ether is fine grained, that is, has a structure, first suggested by Lord Kelvin to be that of a vortex sponge, a perfect tangle of extremely small hollow threads of the fluid ether spinning around their centre lines. This view has been supported by very strong evidence, by leading scientists, and it is now suggested that the screw forms of protons and electrons are simply permanent loops on vortex threads of such an ether; they are permanent, for the two sides of the loop are held together by their common circulation just as an electric loop is held together at the crossing point by its magnetic field.

How the Electricities Were Made.

If a great spin were given to a portion of such an ether, half of its spinning threads would be spun tighter, and the other half untwisted; but when a thread is twisted sufficiently a right- or left-handed loop forms, according to the relative

direction of the original spin of the filament and of the superposed twist. Such loops on a vortex thread are permanent, and have all the properties of the electric charges; when moved they produce circulation around their line of advance, in this way accounting for the magnetic field around a moving charge—since the loops are right- and left-handed, their magnetic fields are opposite in sign, but the loop twisted tighter is smaller than that opened out; therefore one electric charge is smaller than the other, and so the proton is smaller than the electron. The smaller offers more resistance to motion than the larger, for it is more difficult to get a fluid stream through a small orifice than a large one; thus the proton is much more difficult to move than the electron, being 1,850 times more massive.

The Electricities Combine to Form Matter.

There is evidence that the ether is not an incompressible fluid, and that its filaments are short and varying in section, though each in itself has the same circulation, for the protons and electrons all have the same electrical charge; that is, have the same strength, or associated movement, around their centre lines. Imagine these filaments continually joining up and breaking apart as they get too long for stability, in perfect confusion, each retaining its intrinsic energy of spin. No filament has a definite end, or beginning, but its motion is, as it were, trumpet-shaped at each end; when two filaments on which permanent loops have been formed approach, their ends, which have the same direction of circulation, coalesce, but the longer filament so formed is no longer unstable: the two parts when joined form an atom, or part of an atom. If there are only two, one of each, we have a hydrogen atom; the next highest, the helium atom, is much more complex, and the scale of complexity rises rapidly according to clearly-defined laws.

The ether itself is an insulator, that is, it contains no free isolated electric charges, but it transmits electric waves by the rocking motion communicated to its filaments by the oscillation of an electric charge in an atom, in which case the waves are short; or by electrical oscillations on conductors (forming, for example, the aerials of radio systems) when the waves may be miles long; in every case, X-rays, light, or radio, the mechanism and velocity of transmission are the same. A charge in its motion drags the adjacent filaments in contact with it around as it passes: they at once relax to their old position, but because their motion has magnetic energy, they overshoot and oscillate, handing on the motion to the next filaments at the speed of light. To have this high frequency the ether behaves, because of its intrinsic spinning motion, as a very rigid medium with an extremely high coefficient of elasticity.

Matter in Motion.

Electricity in motion produces magnetism. Since all matter is electricity and contains equal quantities of each kind, matter moved through space does not give rise to any external magnetic effect: the two kinds counteract one another, but when the motion takes place in a magnetic field, the resultant force on all the positive charges which form matter is in one direction, sideways to the motion; that on the negative charges is in the reverse direction, and the charges therefore separate a little and the body is said to be polarised. If it is an insulator, the polarisation is proportional to the velocity of movement; if a conductor, it is also proportional, but only one charge (the negative) can move. All the positive charge is anchored in the nuclei of atoms and cannot move bodily, but in metals and similar substances a great number of negative charges are free to move about like molecules in a stream, and when such a body is moved in a magnetic field there is a piling up of negative charge at one end of the conductor—resulting in what is called the open-circuit voltage. When the ends of the conductor are joined, a stream of (negative) electrons passes through the external circuit and back into the wire forming a completely closed path, the motion of the conductor through the magnetic field causing it to act as an electron pump, or dynamo. The work done in causing the electric charges to stream along in this way is not dissipated (or only a small portion of it) in the machine, but is handed on to the external circuit.

[The lecture, which has been delivered before crowded audiences in London and at eight local I.E.E. Centres, some of which were joint meetings with other societies, was illustrated with lantern slides and effective demonstrations.—EDS. ELEC. REV.]

Electric Lamps and Valves.

An indication of the nature of some of the problems encountered by manufacturers who seek a reduction of empiricism in process operations: efforts to solve them lead to fundamental questions which science has so far failed to answer.

(*Abstract of Lecture delivered before the* ROYAL SOCIETY OF ARTS.)

THE Hall of the Royal Society of Arts in John Street, Adelphi, has not often been more crowded than on the occasion of the lecture with demonstrations and experiments, given on Wednesday, February 16th, by Mr. C. C. Paterson, Director of the Research Laboratories of the General Electric Co., Ltd., at Wembley.

The first part of the lecture related to the change that has come about in the manufacture of incandescent lamps during the past decade, hand manipulation having largely given way to mass production; there is still much hand work in the manipulation of the filament, but the bulk of the processes is carried out automatically. Ten years ago the output of ordinary incandescent electric lamps during the final stages of manufacture was at the rate of three per operator per hour; to-day it frequently touches 25 per operator per hour. The total world consumption of lamps at the present day is about 600 millions per annum, of which this country manufactures and consumes about 30 millions. This might sound a small proportion, said Mr. Paterson, but in itself it was a large quantity, and one which would clearly be increased very greatly in the future.

The valve, thermionic or otherwise, was subject to the antagonistic efforts of those, on the one hand, who, for the sake of efficient production and standardisation, desired to limit the number of types to a minimum and, on the other hand, of those who found in the many possible variations of design an opportunity to obtain interesting results in combination with the many possible variations in wireless receiving circuits. Hence, where the production engineer could plan for the lamp in terms of hundreds of thousands of a type, he must, in the case of the valve, be content with tens of thousands. The resulting difference in efficiency of production was considerable, but at the present stage of development it was probably inevitable.

The paper briefly surveyed some of the materials involved in lamp and valve making, after which detailed consideration was given to the vacuum, the transmitting valve, and the filaments of both lamps and valves. With regard to the vacuum, the importance of removing the last traces of gas was stressed, it being explained that in gasfilled lamps, and before gas-filling took place, every possible trace of water vapour must be removed, because it acted in relation to the gasfilled lamp filament as cancer did in the animal body and caused alternate local growths and wastage. In ordinary transmitting valves, gas present caused wastage of the filament through bombardment by the gas molecules, and in dull-emitting transmitting and receiving valves, it poisoned the filament surface with a contaminating gas layer through which the electrons could not pass. The first step towards the removal of the last traces of gas was a thorough understanding of the nature, the origin, the quantity and behaviour of the residual gas, because it was the action of the residual gas with which they were most concerned: it was not possible to get rid of all the gas; some remained even in the highest vacuum.

Apart from minute accidental leaks, the gas which was liable to give trouble was that which came from the glass and from the metal electrodes. The glass gas consisted chiefly of water vapour and carbon dioxide in not very unequal proportions, whilst the metal gas was mainly carbon dioxide and hydrogen. In the practical evacuation of lamps there was not usually any trouble through the spoiling of the vacuum by gas from metal, because the total surface of metal was relatively small. It was therefore only necessary to consider seriously the glass gas. It would be easy to evacuate every lamp by long pumping with a good diffusion pump, simultaneously heating the glass, so as to leave it in as gas-free a condition as possible. That, however, would be far too slow and expensive a process and altogether unsuitable for economical mass production. Research workers had, therefore, studied the conditions for the holding of gas down on to glass surfaces with a view to using this phenomenon to the best advantage. The result of this work had been that the capacity of the surface for gas could be enhanced by the con-

densation on the glass of any vaporised solid material, such, for instance, as that of the filament metal itself, or of a coating of any suitable material the vapour of which would condense on the glass. In the case of lamps it was essential that that layer of condensed vapour should be transparent, and phosphorus vapour mixed with cryolite answered the requirements well, the amount of phosphorus used being just sufficient not to colour the bulb, usually coated on to the filament before the latter was mounted. It could also be sprayed on afterwards. After mounting, the bulb was evacuated to as low a pressure as possible by the vacuum pumps, under heat, and sealed off. On heating the filament the phosphorus was immediately vaporised and condensed on the inside walls of the bulb as red phosphorus. Simultaneously, a large number of the gas molecules adhered to the surface and were mixed up with the phosphorus layer. During the condition of violent ionisation existing during the operation, the molecules of red phosphorus on the surface of the layer were subjected to electronic bombardment which converted some of them to white phosphorus, which tended to vaporise again, and then to recondense as red phosphorus on the surface, burying more gas molecules in the layer and presenting always a fresh surface to which gas molecules could attach themselves. The major part of the process was all over in a second or so, but so long as there was any electronic bombardment of the surface it would continue. If, during the life of the lamp, gas tended to be freed, ionisation would increase and so would the process of "clean-up," so that every lamp had its own automatic safety device in the invisible phosphorus layer on the inside surface. This picture, said the lecturer, was simple, but it was to some extent speculative because certain factors were not yet clear. They did not know, for instance, what part was played by the ionisation of the gas molecules themselves. They did know, however, that ionisation was necessary for the "clean-up," although molecules did not go to the walls in an ionised condition.

In the case of thermionic valves of relatively small size, transparency of the deposited layer did not matter, and vaporised magnesium was generally used. This caused the well-known mirror-like appearance of the inside of the bulb of most wireless valves.

Discussing the difficulties encountered in the manufacture of large transmitting valves, and the danger of using large areas of glass which approached the temperature at which there was an apparently continuous evolution of gas from the glass, it was pointed out how the designer had the choice of doing away with glass altogether for large valves, or of restricting its use to those parts where electrical insulation was needed, but which could be kept at a low temperature. On account of its insulating properties, its non-permeability at normal temperature to gas, and its mouldability, glass (or its pure form, silica) was the best material available for that part of a valve where the electrodes were held and where current had to be led from outside the evacuated enclosure to the inside. Metal, however, said Mr. Paterson, was clearly the best material for those parts where great heat energy had to be dissipated and the only means of carrying it away was by water or another form of intensive cooling. Therefore, the water-cooled valve had been developed, the great step forward in connection with which—made originally in America—was the large glass-to-metal joint for connecting the glass ends to the metal centre. The glass-to-metal joint was an established item in the technique of this industry and might have considerable future applications. Such joints had been proved to withstand a pressure of 100 lb. and more at the centre.

The final part of the paper discussed in some detail the more or less well-known features, to engineers, of the manufacture of tungsten filaments, and related the work that had been done towards obtaining filaments of one long crystal instead of a large number of crystals. Here, again, speculation was involved in their knowledge of the crystal structure of filaments and their relation to the properties of the lamp filament after it had become incandescent. Experiments had indicated the nature and trend of research in this direction, but the large question of the ultimate strength of different types of filament and their relative ability to withstand the stresses to which they were liable to be subjected in use, had to be left for want of time. It was pointed out, however, that the properties required in tungsten filaments for valves were very different from those required for lamps. The extraordinary coincidence was noted that the very ingredient, thoria, which for years had been used by lamp makers to restrain grain growth in filaments, should be the one material above all others suitable for contributing an entirely different property, *i.e.*, that of emitting electrons. The "dull-emitting" property of tungsten filaments depended upon the maintenance of a molecular layer of thorium on the surface of the tungsten. This continually evaporated and was constantly replenished from the thoria contained, it was believed, mainly in the grain boundaries of the tungsten metal. This thorium layer facilitated the emission of electrons because one of its specific qualities was to offer a lower resistance to the passage of the electrons than an equivalent layer of tungsten molecules. The layer was readily contaminated by minute traces of oxygen containing gases and vapours, hence the importance of a high vacuum and an agency always at hand to deal chemically with the objectionable molecules. So far, however, as the metallurgy of the filament was concerned, the object was to secure such a grain structure as would afford rapid and plentiful diffusion of thorium to the surface of the metal. The difficulties of the technique and study of this work, continued Mr. Paterson, must be borne in mind; many of the filaments under consideration were of the order of only 0.02 mm. diameter, a size which had the same relation to an ordinary sewing needle as the diameter of the needle had to the wrist of the person using it.

The paper was an attempt to indicate the nature of some of the problems which were forced upon the manufacturer who sought to reduce the amount of empiricism in his processes. The efforts to do so had led very quickly to fundamental questions to which science had not yet given an answer, or, at best, only a partial one. An effort was being made to force the pace in these fields of study for which, in certain ways, the technique of the lamp maker, when used in the laboratory, had unique advantages.

During the course of the lecture a series of interesting experiments and demonstrations was carried out. Among the exhibits was a large incandescent lamp made with the object of seeing to what extent size could go. It was a 10-kW lamp giving 25,000 c.p., and when lighting it Mr. Paterson warned the audience not to look directly at it. Another lamp was shown to illustrate the type of incandescent lamp now used in lighthouses. This was a 3-kW lamp, whilst for comparison there was a 100-volt gasfilled lamp. There was also exhibited a specimen of the large water-cooled valves which are now used at Rugby, Daventry, and elsewhere for wireless transmission, as well as an extra-high-voltage rectifier for 150,000 volts. A 50-lb. weight was hung upon a metal-to-glass joint, referred to in the paper, and the joint held easily. Dr. Smithells, one of Mr. Paterson's colleagues, then put the joint on two chocks and put all his weight upon it without breaking it. Other experiments were in relation to the heating effects upon filaments.

Sir OLIVER LODGE, proposing a hearty vote of thanks to Mr. Paterson, recalled the exhibition in this country of the first electric lamp by Swan, who, at the time, had said he thought it would make a real lamp in time. It seemed incredible that the advances shown by Mr. Paterson to have taken place since that time should have happened within his (Sir Oliver's) lifetime. Those who had been accustomed to work in university laboratories must have felt green with jealousy when they realised the opportunities, the staffs of brilliant workers, and the money available in connection with the research laboratories of our great manufacturing companies. He congratulated the General Electric Co., Ltd., on possessing the services of Mr. Paterson and his assistants, and Mr. Paterson on the General Electric Co., because it was only possible to go ahead at the tremendous rate Mr. Paterson had shown was feasible when one had commerce at one's back.

Correspondence.

***Correspondents should forward their communications* as early as possible.** *No letter can be published unless we have the writer's name and address in our possession.*

A Handicap to Electrical Progress.

In your issue of to-day's date I notice a letter headed "Handicap to Electrical Progress." In the letter Mr. I. Fawcett states that there is only one conclusion to be arrived at from the fact that gas consumers in Leicester have to pay a lower deposit than electricity consumers, but I think that there is another logical conclusion, namely, that a consumer, having been accustomed only to gas supply, realises the cleanliness and convenience of electricity for lighting, heating, and cooking purposes, and as a consequence the consumption naturally increases.

This, of course, leaves out the question of the reduction in the doctors' bills due to the reduced poisonous content of the atmosphere, and possibly in the near future a reduction in life insurance premiums, due to the longer possible duration of life, apart from any tragic suddenness, of which we see so many instances in the newspapers day by day.

Anticipating a larger consumption, the Council will naturally ask for an increased deposit.

T. A. Kerr.

Electricity Works, Trafford Park.
March 18th, 1927.

The Wireless Receiver as a Load.

It is indeed remarkable that in a booklet published by the Association which is trying to increase the uses of electricity, no mention whatever should be made of the wireless receiver, although there is, as the newspapers have long realised, no better headline than "Broadcasting," and there is no electrical apparatus in the house either costing so much, or used so regularly, as the wireless receiver. Why, then, is it so generally ignored by the supply authorities, when it is actually a most useful potential load?

At present, in 99 cases out of 100, the accumulators are charged at a centre with power, probably at the power rate, making a profit for the contractor and using the supply at the time which least suits the station.

In the hundredth case the user charges his own battery—at the lighting rate—for one or a couple of nights per week. It costs him less, his battery lives twice as long, and it is a useful load to the station, apart from the extra life of the carpets!

As a manufacturer who has over 50 receivers running off the mains, I can state quite definitely that with an apparatus costing not more than £5 fitted, any wireless receiver can be run off the mains at a total cost of 1½d. to 2d. per day to the consumer, including h.p. and l.p. (which compares very favourably with the cost of batteries; at the same time it will increase the station revenue by about 1d. per day.

This is, of course, the d.c. figure. The a.c. first cost is higher, but the running figures are the same, or slightly less.

Actual experience of many receivers working off the mains shows that accumulator charging costs are halved as a minimum, accumulators last 2½ years or more as against less than 12 months when charged outside, and, the greatest saving to the user, valves last very much longer.

Apart from this, there is a constant and ample supply of h.p. and no battery crackling.

Surely one penny per day per receiver (as a night load only) is useful to "the chiefs."

Ernest J. Baty.

Luton, *March 18th*, 1927.

The Salaries of Engineers.

Those who have written on the above subject in your columns in the previous two or three issues, are quite right in the severe blame handed out to the Institution of Electrical Engineers. The National Union of Scientific Workers, which was mentioned by your first correspondent, is equally guilty of neglecting to attach due importance to the financial interests of its members. I suggest that both these institutions would greatly increase their usefulness by appointing committees of young engineers to investigate the whole matter of remuneration. The older and more influential members, being permanently in receipt of comfortable salaries, devote themselves to academic interests, neglecting even to study the financial positions of their own employés.

Although I agree to this extent with previous correspondents, I must say that engineers themselves are somewhat to blame in submitting to the treatment meted out to them. They have a very justifiable grouse, but are too lethargic to take steps to get it rectified. That lethargy, however, does not extend to their sphere of labours, for no body of men is more efficient or conscientious.

A great share of blame, however, lies on the employers. They wilfully pay their technical staffs immorally low salaries, knowing full well that this class of employé, at present, has no means of obtaining redress. Some time ago, I saw the statement by a competent authority that the adult human being had a capital value of £12,000. On a basis of 50 years' purchase, without interest, this amounts to £240 per year. This figure should be a *basis* salary for every decently educated person in the country, adjustments being made for the nature of the work being done by the individual, and for the size of his family. This view is not merely a Utopian one, but is sound business, and on some such lines the solution will eventually be found.

Yet Another.

March 14th, 1927.

Your "Poor Blighter" letters should possess an important interest for those who are in a position to deal with the matter at issue.

There is no doubt that the question of engineers' salaries is very largely wrapped up with the question of "supply and demand." This is, it would seem, quite a wrong basis on which to settle the salary question, even as it is wrong to immediately increase the price of a commodity because there is a temporary shortage of that commodity.

Whilst this basis is retained, and the works and colleges are turning out annually an ever-increasing number of young men who have in their studies attained a high standard of engineering knowledge, it would seem that some scale providing a suitable minimum salary should be enforced upon those employers who, under the present wage or salary system, are acting much in the same way as did the "war profiteers" throughout the great "European Upheaval," all of which simply points to a degradation terrible to contemplate, and of which modern industrial history gives too many examples.

As evidence of the deplorable condition of the labour market so far as concerns skilled technical work, may I cite a recent instance which came to my knowledge, of a vacancy for a junior in a small generating station. Among the 72 applications for this unimportant post were, I understand, the following:—Two B.Sc.'s (Eng.), one Whitworth exhibitioner, one qualified for Assoc. Membership of the Civils, and seven A.M.I.E.E.'s. Among the remainder, most of whom were reasonably worthy applicants, were two with 1st Class B.O.T. marine engineer certificates. The wage for this job was 40s. per week—the job was waiting for a youth.

This is a pointer, and indicates to my mind a rather sad state of affairs, and much would seem to be necessary of achievement, so far as the electrical industry is concerned, before these mostly unemployed qualified men are found their proper work in the world.

The general opinion is, I am afraid, that matters are becoming worse year by year, and who can wonder at it when one reads in the newspaper of a prominent electrical engineer consultant, and M.I.E.E. (till a few years ago, a monument of enterprise in the electricity supply business) engaging himself (probably for a suitable fee, for most consultants, I am told, have the money sense reasonably developed) to the National Gas Council, for the express purpose of opposing a municipal application for a Provisional Electricity Order.

One reads also of electrical consultants who specialise their efforts among the gas concerns throughout the country, some of which have, more or less successfully, been persuaded to take up the supply of electricity.

It may be urged in the wider interests that in some localities no alternative existed, but in an equally large number of cases it would appear that in the long run, such combination of interests (*i.e.*, gas and electricity supplied by the same authority from the same roof, under one management) does not favour the electrical industry, especially where, as in the majority of cases, the gas manager suddenly has to apply himself to the study of elementary electrical engineering, as a result of his being appointed "electrical and gas engineer."

Something has to be done, and the sooner the question of engineers' salaries (I refer to those outside the membership of the E.P.E.A.) is faced in a reasonable way, the better and more enthusiastic will service be rendered, and the produce of that service increased.

Here then, perhaps, the I.E.E. may find food for thought, for anything that is inimical to the interests of the electrical industry and the proper status of those engaged within it should arouse their attention, and bring forth their corrective and helpful influence.

P. W.

March 7th, 1927.

Your numerous correspondents on the above subject seem to miss the most important aspect of the question, namely, the fundamental economic law of supply and demand. As long as our technical institutions are allowed to turn out trained engineers in hundreds per annum irrespective of the state of the labour market, there will always be a considerable surplus for employers to draw upon, with the consequent deplorable remuneration of those who are already employed.

Some method similar to that adopted by America, of allowing only a certain quota of immigrants to enter each year, appears to be necessary to the engineering profession if the status of engineers is to be raised.

One of your correspondents, speaking for the Society of Technical Engineers, hopes to attain this desirable state of affairs by registering engineers by act of Parliament, so that by some mysterious means the salaries of engineers would rise automatically. He draws the analogy of the British Medical Association; but the latter is more or less a homogeneous body with a common object, whereas a registered body of engineers would consist of both employers and employés whose aims would cancel one another.

It is, of course, no simple matter to restrict the production of engineers now that matters have reached the present deplorable state, but one can always attempt to persuade parents seeking a career for their sons to place them where they are much more likely to lead a civilised existence.

They might do worse, for example, than apprentice them to a grocer, fishmonger, or publican. There is always the prospect of a seat on the local Council or in the House of Commons, and with their lack of knowledge of the elements of electricity they may even attain a position on the Central Electricity Board.

M.Sc.

March 18th, 1927.

Faults in Flexibles.

In calling attention to the above matter you are doing good service.

In my experience too little care is *taken* in the selection of a suitable flexible cord, particularly for portable electrical appliances and pear switches.

The danger with a faulty cord is not a short circuit, as the circuit fuse usually takes care of that; what usually happens is the following:—Owing to insufficient mechanical strength, the strands gradually break until continuity is maintained by a few wires only, which heat up; arcing occurs as the strands intermittently make contact, causing the rubber and/or the textile covering to smoulder, and if not promptly checked a fire may result.

In order to overcome these risks my firm introduced, a few years ago, a flexible cord named "Feraflex," incorporating with the copper wires several fine steel wires; over the insulation of these strands is woven a fine asbestos yarn which would effectively stifle any tendency to spark or flame; the conductors are twisted together, and to prevent kinking are braided over the twist with polished cotton or silk. This cord, used with electric irons, table lamps, vacuum cleaners, and other portable appliances, has been very successful; it is neat in appearance and unobtrusive.

Unfortunately, with the craze for cheapness, the flexible cord largely used is the cheap foreign make with a thin film of rubber, which constitutes a positive danger.

For pendant lights the 20-mil pure rubber insulation flexible with conductors of not less than 23/36 will be found safest. The so-called "workshop flexible," with the conductors under a compounded braiding, is not, in my opinion, a desirable or safe cord to use.

S. A. Laird,
London Manager, WARD & GOLDSTONE, LTD.

London, *March 15th*, 1927.

Electric Cookers in Housing Schemes.

I am anxious to obtain information upon the following subjects with reference to the installation of electric cookers in houses erected by the local councils:—

(1) Have they proved satisfactory?
(2) Under what conditions are they fixed—such as initial charges and price per unit?
(3) Are the consumers satisfied as regards the cost of installation and also the price per unit?
(4) Type of stove used?

Thanking you and your readers in anticipation.

H. A. Woods.

London, *March 16th*, 1927.

Parliamentary News.

[By Our Special Parliamentary Correspondent.]

Private Bills.

The Farnham Gas and Electricity Bill has been read a third time in the House of Commons, and the North Metropolitan Electric Power Supply Bill has been read a second time.

Rugby Wireless Station.

On March 14th, Viscount WOLMER, Assistant Postmaster-General, informed Sir F. Wise that the cost of the Rugby wireless station, including the site, buildings and plant, was about £480,000.

Broadcasting.

On March 15th, in reply to questions by Sir H. Brittain, the POSTMASTER-GENERAL said that the rule governing the use of wireless receiving sets in hospitals was that a single licence covered the installation of any number of receiving sets for general use in the main building; but separate licences were necessary for sets installed in other buildings, for example, in the private residential quarters of members of the staff. He was always prepared to give consideration to any case in which a strict application of the rule appeared to work harshly.

Asked by Sir H. Brittain how many cars were made use of throughout the country for the detection of the source of oscillation caused by wireless sets, Sir W. MITCHELL-THOMSON said that one car was in use at present. A second car was on order.

Viscount WOLMER informed Mr. Day that five persons had been prosecuted for using wireless transmitting apparatus without a licence. A conviction was obtained in each case, and the penalties ranged from a fine of £4 to a fine of £10, in addition to £5 costs. In two of the cases the apparatus was confiscated.

Ultra-Violet Ray Treatment.

On March 17th, Mr. DAY asked the Minister of Health whether his notice had been drawn to the refusal of the Public Control Committee of the London County Council to amend its massage licence to include ultra-violet ray treatment under medical supervision, on account of the potential danger to the amateur and inexpert; and whether he would consider the introduction of legislation to restrict the sale or use of such apparatus to persons with medical experience only.

Mr. CHAMBERLAIN said he had no information as to the fact stated in the first part of the question, and he was not aware of any necessity for legislation of the kind suggested.

The Hastings Electricity Order.

Application was made to the Special Orders Committee of the House of Lords on March 15th, by the Hastings and St. Leonards Gas Co. for a further inquiry into the Hastings Electricity (Extension) Special Order, 1927, to consider a claim for the insertion of a clause affording protection to ratepayers against any loss which might be incurred by the Corporation in the supply of electricity in the extended area.

For the Gas Co. it was stated that the Order proposed to extend the area of the Corporation for the supply of electricity to include the borough of Rye, the urban district of Battle, the rural districts of Hastings, Rye and Battle, and the parish of Ninfield, in the rural district of Hailsham. The Gas Co. supplied gas in the borough of Hastings and various outlying places, including some of the parishes and places comprising the added area for the supply of electricity by the Corporation, and it was also one of the largest ratepayers in the borough. It alleged that its property, rights and interests would be injuriously affected by the Order. During the proceedings on a 1924 Bill the Corporation had stated that its electricity undertaking was working at a profit, and at that time it was affording a supply in bulk to Bexhill from a new power station. The price of that supply was an uneconomic one. It was admitted at a local inquiry held in 1925 that at the time of the promotion of the 1924 Bill the Corporation had in mind the extension of area now proposed. It appeared at that inquiry that the scheme of the Corporation would not be self-supporting; it was admitted by the Corporation that there would be a loss during the first few years. The Gas Co. pointed out that quite apart from any question of loss in relation to the proposed extension of area, there was a deficiency at present of some £23,000 on the working of the existing electricity undertaking. It was admitted at the inquiry that within five years the capacity of the existing generating station would only be sufficient to meet the needs of Hastings coupled with the supply to Bexhill, even if there were no added area. Therefore, with the added area, further capital expenditure on that generating station would be necessary at an early date.

A statement submitted to the Committee on behalf of the Hastings Corporation said that when the Corporation applied for the Order the Gas Co. had lodged objections, and the Electricity Commissioners had caused a local inquiry to be held. After full consideration the Commissioners had determined to grant the Order without the insertion of the protective clause now asked for. The Order was submitted to the Minister of Transport for confirmation, and after an inquiry had been held into the memorial of the Gas Co., the Minister had confirmed the Order without the insertion of the clause. Committees of both the House of Lords and the House of Commons had refused to insert the clause in the Corporation's 1924 Bill. The Corporation was convinced that within a comparatively short time the scheme would not only be self-supporting, but would be a profitable undertaking. The Corporation's figures had been accepted, both by the Electricity Commissioners and the Minister of Transport.

The total amount received from the rates by the electricity undertaking was £35,232, all of which was received earlier than 1920. Since April 1st, 1921, the undertaking had transferred in aid of rates £12,140, leaving a net deficiency of £23,092. As against this deficiency there must in fairness be set off the reserve fund of the undertaking, which at March 31st, 1926, totalled £25,904, and at the same date there was an unappropriated profit to the credit of the undertaking of £6,731. Certain ratepayers who appeared at the original local inquiry in addition to the Gas Co. had not pursued their opposition either before the Minister of Transport or Parliament. Finally, the Corporation submitted that the petition disclosed no substantial grounds for complaint; and that the subject matter of the Order had been so dealt with in departmental inquiries that further inquiry was unnecessary.

The Committee decided that further inquiry was not necessary.

Legal.

Southern Counties Electric Light and Power Supply, Ltd.

MR. Justice Romer, in the Companies' Winding-up Court, on March 15th, had before him the petition of Mr. Percy Green, of Leamington Spa, a judgment creditor, for an order for the compulsory liquidation of the Southern Counties Electric Light and Power Supply, Ltd.

Counsel for the petitioner said he was substituted for a previous petitioner last week, and the petition had had to be amended and filed, but the affidavit verifying that had not yet been sworn. He therefore asked for the petition to be adjourned for a week.

Mr. BISCHOFF said he appeared for the original petitioner. He was paid a cheque for the amount of his debt and costs, and the petition was adjourned to see if the cheque would be cleared. The cheque had been cleared, but it was not accepted as payment, although the money was in hand pending the result of the petition. If an order was made it would be returned as having been paid since the commencement of the winding-up.

Mr. HECKSHER said he represented a judgment creditor who was in the same position, and he was also holding the proceeds of a cheque which he had received until a decision on the petition had been given.

His Lordship adjourned the petition for a week.

Theft of Electricity.

AT the Castle Eden (Durham) Police Court, on March 19th, John G. Cutter, a Minor of Thornley, was prosecuted at the instance of the Weardale Coal Company for the theft of electricity, the property of the company. It was stated that the company supplied electricity to the defendant's house, and upon inspection it was found that the meter had been short-circuited, rendering it ineffective. The company believed that this state of affairs had lasted for some time. A fine of 40s. was imposed.

Reviews.

The New Electricity Act. By W. S. Kennedy, LL.B. Pp. 142. London: Ernest Benn, Ltd. Price 6s. net.

The author of "The Electricity (Supply) Act, 1919," has lost no time in preparing a similar "popular exposition" of the new measure from which so much is expected. His explanatory analysis of the Act, published in our issues of January 14th and 21st, was necessarily restricted to its leading features: in this book he has endeavoured to translate the cumbrous phraseology of the Act into more comprehensible and readable English, and to explain briefly what the Act means to the man in the street. He does not, however, profess to give a detailed exposition of the Act, nor does he comment on its working. The book deals with the Act under seven divisions, taking the sections in order, with separate *résumés* of the provisions relating to arbitration, and the relations between the Board and the Electricity Commissioners, which, in some respects, are "rather anomalous." The remainder of the volume (60 pp.) is occupied with the complete text of the Act, and the index.

The Electricity (Supply) Act, 1926. By T. J. Sophian. Pp. vi+62. London: Sweet & Maxwell, Ltd. Price 4s. 6d. net.

This is a publication in separate form of an extract from Chitty's Annual Statutes, 1926, and is intended for the guidance of those who have occasion to study or refer to the Act. It consists in the main of a reprint of the Act, with a subject index, and numerous footnotes referring to previous Acts, cross-references to sections of the 1926 Act itself, excerpts from Acts partly repealed or modified, and explanatory comments. A prefatory note contains the memorandum presented to Parliament on the introduction of the Electricity (Supply) Bill, explaining its objects and origin.

The Electricity (Supply) Act, 1926. By E. J. Rimmer, B.Sc., M.Eng., and G. Read Allen, M.C. Pp. v+206. London: Solicitors' Law Stationery Society, Ltd. Price 12s. 6d. net.

This volume contains a table of statutes relating, however remotely, to electricity supply, with references to the pages on which they are cited, an introduction briefly reviewing the Electric Lighting Acts as a whole, with extended reference to those of 1919 and 1922, and a summary of the main provisions of the Act of 1926, which occupies 45 pages. A useful table shows the sanctions which the Board must obtain before it can exercise certain of its powers; this occupies three pages. It is pointed out that the powers and duties of the Electricity Commissioners have been extended, not diminished, by the new Act; their control in technical matters remains complete, many of the powers of the Minister of Transport have been delegated to them, and their authority has been strengthened; the changes in their powers and duties are set out in five pages. All the provisions of the Act relating to prices, charges, and valuation have been brought together under one heading.

There follows a complete reprint of the Act of 1926, with explanatory notes, cross references, references to other Acts, and comments. An appendix gives the text of the Electricity (Supply) Acts of 1919 and 1922, and a full subject index occupies 18 pages. Both of the authors are engineers as well as barristers-at-law, and have given attention to the engineering as well as the legal aspects of the Act.

The Electricity (Supply) Act, 1926. By J. C. Dalton, A.M.I.E.E. Pp. xviii+152. London: Butterworth & Co. Price 10s. 6d. net.

This is a supplement to "Will's Electric Lighting," 5th edition, and to those who are familiar with that invaluable work no more need be said. It is self-contained, as far as possible, but cross references to the parent book are given. A table of Statutes occupies seven pages, and a table of Cases is given. The history of the Act of 1926 is briefly outlined, and the Weir Report is summarised; the author then devotes separate chapters to the Central Electricity Board, schemes, the position of undertakers and others in relation to the Board, other provisions of the Act, and the consumer, after which the text of the Act, fully annotated with critical and explanatory comments and references, occupies 94 pages. A very complete subject index is provided. The contents of this book bear evidence of an exhaustive study of the Act and of its relation to previous Acts and existing conditions, involving untiring industry and a profound knowledge of the law of electricity supply. It is a worthy supplement to "Will's Electric Lighting"—and that, perhaps, is as high a compliment as the author and publishers could wish for.

Polyphase Induction Motors. By R. D. Archibald, D.Sc., M.I.E.E. Pp. vii+88; figs. 46. London: Chapman and Hall, Ltd. Price, 5s. net.

The growing importance of the induction motor amply justifies the appearance of a small work for the use of those who, without wishing to take up the problem of the design of this machine, are desirous of obtaining a sound knowledge of the principles of its construction and of its operating characteristics. Dr. Archibald's little book is evidently intended for such readers, it is generally non-mathematical in character, and will teach those interested in the elements of the induction motor, most of what they ought to know. It is difficult, in the limited compass which the author has allowed himself, to make a judicious selection of the many aspects of the whole subject which are of general interest. It is possible to criticise the selection which has been made, on the ground that to the majority of operating engineers a fuller discussion of the subjects of speed control and methods of starting would have been of greater interest than a detailed treatment of the conditions existing in the magnetic circuit of the machine. The general structure of the book is such that it is perhaps more useful as an introduction to a more complete study of the induction motor, than as a handbook for the use of the general electrical engineering reader.

The first chapter of the book is devoted to an elementary explanation of the principles of the operation of the polyphase machine, the production of a rotating field, and general details of construction. Chapter II deals with the circle diagram in its approximate form, its derivation, application, and construction from the results of open- and short-circuit tests. The author then proceeds to considerations of the distribution of the magnetic flux, the meaning of dispersion co-efficient, its approximate calculation from design data, and from the circle diagram. A chapter then follows, which gives detailed calculations relating to an actual machine, which serve to illustrate the foregoing work. The final chapter deals with operating characteristics, methods of starting, and speed control, the treatment of the last subject being rather sketchy. More space might well have been devoted to the discussion of the speed-torque characteristic; an investigation of the simple equation connecting these two quantities is very instructive.

There are a number of examples for solution at the end of the book, with answers, and also an index. The work will be found useful for those intending to proceed to a more extended study of the induction motor.

Makers of Science: Electricity and Magnetism. By D. M. Turner, M.A., B.Sc. Pp. xv+184; figs. 65. Oxford University Press. London: Humphrey Milford. Price, 7s. 6d. net.

This small volume is not confined exclusively to biographical sketches of the great outstanding personalities who have left their impress on the development of electrical science, but gives, in addition, brief outlines of the principal contributions which they have made to this development. Beginning, really, with Petrus Peregrinus in the thirteenth century, the author deals in chronological order with the work of Gilbert, of Colchester, and that of each of his successors who have carried the torch of science up to our own times. It is a fascinating record, and one which will bear reading over and over again because of the personal and human element with which the author has invested it. It would seem invidious almost to select one or more of those, whose work is dealt with here, for illustrative purposes; but the manner in which the contributions to science by Faraday and Maxwell have been treated is all that one could expect within the limits to which the author has restricted himself.

The field covered includes electrostatics, the electric current, electromagnetism, electromagnetic induction, the development of electrical theory, electrolysis, the conduction of electricity through gases, and the electrical constitution of matter. In the last chapter we are brought right up to the work of J. J. Thomson, Bragg, and Moseley, on the connection between electricity and matter; but, in the words of the author, "if we ask 'what is electricity' we are left with an unanswered question." It is somewhat surprising to find, however, no reference to the work of Eddington or of Jeans in the sphere of astrophysics, and the bearing that such work is having on our knowledge of the constitution of matter and of its relation to radiation, but probably it is of too recent a date to admit of its incorporation in the book.

An introductory chapter on the need for a History of Science is furnished by Dr. Charles Singer. There are 65 illustrations throughout the text, including a number of portraits; that of Faraday is particularly good. We heartily recommend the book as one which will be appreciated by the layman as well as the student of science.

Rotary and Motor Convertors. By E. F. Smith. Pp. xii+233; figs. 57. London: Crosby, Lockwood & Son. 1926. Price, 7s. 6d. net.

The scope of this book is considerably wider than is indicated by the title, the author having written it for the information of operators and attendants, who have had no educational grounding in the elements of electrical technology. The work therefore contains an outline, in simple non-mathematical language, of the principles of direct-current generators and motors, of alternating currents, the effects of inductance and capacity, and of the principles of the a.c. generator. Mr. Smith has set himself a difficult task, in endeavouring to cover this ground as an introduction to the main subject, especially as he has deprived himself of the assistance of elementary algebraic symbolism. It is difficult to say how far

the previously uninstructed reader will benefit by a study of this preliminary matter. It is generally very clearly written, and little has been omitted which is of real importance. Those who are not averse to some hard thinking, will probably succeed in obtaining a working knowledge of the basic principles, which will enable them to understand very fairly, the operating characteristics of the rotary convertor. We think, however, that most of those who have been able to follow the author's explanation of vector diagrams, would have been able to understand the derivation of the numerical voltage relationships in 2, 3, and 6-phase circuits. These should have been proved, and the numbers $\sqrt{2}$, $\sqrt{3}$, and so forth, used instead of 1.73 and 1.41. It is stated on p. 95, that in paralleling a polyphase generator it is necessary to synchronise on one phase only, the author should have pointed out that, although this applied to normal operation, the phase rotation must be checked when the machine is paralleled for the first time.

Turning to the treatment of the subject matter of the book, we find that this is dealt with in a very clear and practical fashion. After considering the basic principles of the rotary convertor, the author proceeds to describe the usual methods of voltage control. A little fuller treatment of the reactance method might have been given. The variation of power factor necessary in normal working, depends not only on the normal variation of the voltage required, but also on the value of the series reactance; this is not made sufficiently clear on p. 127. Methods of starting are very fully considered, three chapters being devoted to this subject. These are very good, and the author gives as clear an explanation of the self-synchronising of a convertor, as is possible, without the aid of mathematical analysis. We see no reference to the use of a double winding for the stator of a starting motor. An interesting chapter deals with static balancing, and with inverted running. Transformers for rotary convertors are then considered in an elementary way, and the various connections for phase conversion are clearly worked out. The final chapter deals with the principles of the motor convertor, with notes on starting, static balancing, and inverted running.

We can recommend this book without hesitation to those for whom it has been written, and we think that all engineers who are not specialists in the design or operation of rotary convertors, will gain much useful information by a perusal of its pages. Should a subsequent edition be called for, a chapter on the automatic control of rotary convertors might well be added.

Published Specifications.

Compiled expressly for this journal by a firm of Chartered Patent Agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1925.

20,586. "Alternating-current motors." J. Sousedik. August 16th, 1924. (238,569.)

21,509. "Manufacture of metals and alloys in the electric furnace." D. Crosse. August 27th, 1925. (266,658.)

23,664. "Acoustic apparatus." Standard Telephones and Cables, Ltd. (Bell Telephone Laboratories, Inc.). September 22nd, 1925. (266,395.)

23,876. "Switching mechanisms for use in telephone or like systems." Automatic Telephone Manufacturing Co., Ltd. (Automatic Electric Co.). September 24th, 1925. (266,399.)

24,525. "Method of ensuring electrical contact between electrical conductors." H. Martin. October 1st, 1925. (266,403.)

26,794. "Synchronised asynchronous machines." J. V. Eclancher. May 1st, 1925. (251,587.)

28,425. "Electric heat radiating and distributing apparatus." A. F. Berry. November 11th, 1925. (266,421.)

28,543. "Insulating high-tension electric currents." O. Y. Imray (Akt. Ges. fur Anilin-Fabrikation). November 12th, 1925. (Convention date not granted.) (244,068.)

29,145. "Electric street-lighting equipment." Horstmann Gear Co., Ltd., J. H. G. Horstmann, E. H. Horstmann, A. Horstmann, and F. O. Horstmann. November 19th, 1925. (266,426.)

29,235. "Electric oscillators." W. H. Wilson. November 19th, 1925. (266,428.)

29,375. "Intermittent electric current interrupter for use with vehicle-direction signals." G. F. Rayner (Winooski Electric Manufacturing Co., Inc.). November 20th, 1925. (266,431.)

29,498. "Interlocking cover for electric cables." J. Bruce and Rom River Co., Ltd. November 23rd, 1925. (266,433.)

29,514. "Installations for electrically lighting, heating, and ventilating railway and like vehicles." J. Stone & Co., Ltd., and A. H. Darker. November 23rd, 1925. (266,434.)

29,583. "Directional radio signalling systems." Standard Telephones and Cables, Ltd. (Western Electric Co. Inc.). November 24th, 1925. (266,440.)

29,698. "Sound reproducing and amplifying devices." A. G. Griggs and J. C. Meuwsen. November 24th, 1925. (266,450.)

29,717. "Electric control systems." Igranic Electric Co., Ltd., and J. H. Abbink-Spaink. November 25th, 1925. (266,452.)

29,743. "Electric lighting and power plants." Austin Lighting Co. and C. B. Walker. November 24th, 1925. (266,452.)

29,892. "Voice operated relay systems." Standard Telephones and Cables, Ltd. (Western Electric Co. Inc.). November 26th, 1925. (266,458.)

29,893. "Automatic and semi-automatic telephone systems." Standard Telephones and Cables, Ltd. (Western Electric Co., G. C. Hartley). November 26th, 1925. (Cognate application 31,713/25.) (266,459.)

29,896. "Telephone systems." Siemens Bros. & Co., Ltd., and H. E. Humphries. November 26th, 1925. (266,460.)

30,266. "Protection of electrical circuits." A. M. Baroni, N. Pancotto and G. Rogora. November 30th, 1925. (266,471.)

30,359. "Thermionic valve and like circuits." Soc. d'Etudes pour Laisons Téléphoniques et Télégraphiques à Longue Distance. December 1st, 1924. (243,765.)

30,360. "Amplifying or detecting relays." Soc. d'Etudes pour Laisons Téléphoniques et Télégraphiques à Longue Distance. May 4th, 1925. (251,588.)

30,325. "Lamp-shade holder." British Thomson-Houston Co., Ltd., W. H. Wade, F. M. Cocksedge, and H. C. Wheat. December 1st, 1925. (266,475.)

30,345. "Thermionic devices." S. L. Price. December 1st, 1925. (266,476.)

30,600. "Form of valve for wireless transmission and reception." A. T. Masterman. December 3rd, 1925. (266,480.)

31,136. "Train-control systems." Automatic Telephone Manufacturing Co., Ltd., and A. E. Hudd. December 9th, 1925. (266,485.)

31,746. "Appliance for the application of radiant energy in the form of light or ultra-violet light in medicine and the sciences." A. A. King. December 16th, 1925. (266,489.)

32,445. "Electrostatic devices." M. Graham, A. Graham (executors of E. A. Graham, deceased), and W. J. Rickets. December 23rd, 1925. (266,491.)

33,011. "Electric storage batteries or electric accumulators." Fuller's United Electric Works, Ltd., and S. C. Whaite. December 31st, 1925. (266,497.)

1926.

621. "Systems of controlling electric motors for starting synchronous machines." Crompton & Co., Ltd., and H. O. Burge. January 8th, 1926. (266,504.)

2,290. "Diaphragms for telephones, talking-machines, and the like." R. French. January 20th, 1926. (266,513.)

2,511. "Automatic voltage-limiting means." International General Electric Co., Inc. January 29th, 1925. (246,855.)

2,683. "Electric motor control systems." C. E. Carpenter. January 29th, 1926. (266,518.)

6,361. "Tuned radio-frequency receiving circuits." Lovejoy Development Corporation. December 15th, 1925. (263,077.)

7,587. "Loud speakers for wireless receiving apparatus." F. M. T. Reilly. January 6th, 1926. (Cognate applications, 13,812/26 and 20,359/26.) (Divided application on 347/26.) (266,543.)

7,634. "Electric ovens, particularly for dental purposes." W. Hoberg. August 26th, 1925. (Divided application on 239,213.) (266,544.)

7,636. "Ignition apparatus for internal combustion engines." W. R. Lambert (G. Walters). March 19th, 1926. (266,545.)

7,987. "Protective systems for metal-vapour rectifiers." Akt. Ges. Brown, Boveri et Cie. April 6th, 1925. (250,216.)

8,002. "Electric water heaters." S. D. White and W. B. Scourfield. March 23rd, 1926. (266,550.)

8,882. "Electric lamps." Howes & Burley, Ltd., and A. Barlow. April 1st, 1926. (266,553.)

9,303. "Sound-reproducing and transmitting apparatus." W. J. Rickets. April 8th, 1926. (266,555.)

9,397 "Electric pianofortes." H. Wade (Mills Novelty Co.). April 9th, 1926. (266,556.)

11,554. "Electric batteries." E. R. Gill. May 1st, 1926. (266,565.)

14,855. "Joints for high-tension electric cables" Pirelli & Co. July 11th, 1925. (255,033.)

16,594. "Transmission and reproduction of views, scenes, or images by wires or wirelessly." J. L. Baird. September 1st, 1925. (Divided application on 21,846/25.) (266,591.)

16,988. "No-volt release switches or circuit breakers." A. M. Bridger. July 7th, 1926. (266,593.)

18,511. "Incandescent lamp for automobile headlights." N. C. Austin. July 24th, 1926. (266,601.)

18,835. "Electric driers." Halliwell-Shelton Electric Corporation. February 25th, 1926. (266,604.)

18,846. "Train-control systems." Automatic Telephone Manufacturing Co., Ltd., and A. E. Hudd. December 9th, 1925. (Divided application on 266,485.) (266,605.)

19,022. "Regulating systems for dynamo-electric machines." British Thomson-Houston Co., Ltd. August 11th, 1925. (256,949.)

19,127. "Method of, and apparatus for testing electrical insulators." A. O. Austin. July 31st, 1926. (266,608.)

19,914. "Electric welding apparatus." E. G. Budd Manufacturing Co. August 15th, 1925. (256,981.)

20,061. "Train-control systems." Automatic Telephone Manufacturing Co., Ltd., and A. E. Hudd. December 9th, 1925. (Divided application on 266,485.) (266,611.)

21,129. "Reproduction of sound." A. Poulsen and A. C. G. Petersen. September 3rd, 1925. (257,920.)

22,656. "Controlling apparatus for electrically driven machines specially applicable to washing machines." British-American Laundry Machinery Co., Ltd. (American Laundry Machinery Co.). September 14th, 1926. (266,623.)

22,662. "Glareless lamps." J. M. Stewart. September 14th, 1926. (266,624.)

24,185. "Radio transmitters." Telefunken Ges. für Drahtlose Telegraphie. October 1st, 1925. (259,225.)

26,202. "Generation of electrical oscillations." Dr. A. Esau. November 10th, 1925. (261,351.)

27,322. "Railway signalling systems." International General Electric Co., Inc. October 31st, 1925. (260,627.)

27,771. "Oscillating electric fans." H. W. Gilbert, H. C. E. Jacoby and A. E. Jabet. March 22nd, 1926. (Divided application on 263,003). (266,638.)

30,290. "Holders for tubular electric lamps." H. Friedeberg. December 3rd, 1925. (262,424.)

31,008. "Regulatable resistances." Siemens & Halske Akt.-Ges. December 8th, 1925. (262,778.)

31,463. "Electric seam-welding machines." R. Mack. December 29th, 1925. (263,783.)

1927.

1,886. "Identification label for insulated conductors." H. Bokelmann and H. Gastrow. February 26th, 1926. (266,655.)

Trade Mark Applications.

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from March 16th:—

Pervana. No. 473,957. Class 8. Electrical transformers for use in connection with radio-telephony and telegraphy.—Radioland Co., Ltd., 65, Houndsditch, E.1.

Goldstream. No. 477,523. Class 9. Apparatus for use in radio-telegraphy and telephony.—Julius Axelrad, 25, Mornington Crescent, N.W.1.

Leonardian. No. 477,391. Class 13. Lead tee boxes or service branch boxes for electric cables.—T. L. Watkins, 52, Oxford Street, Kidderminster.

Esboilith. No. 474,891. Class 50. Casein in sheets and rods for industrial purposes, electrical fittings, &c.—Ellenberger & Schrecker, 94, Burgegnstrasse, Frankfort. (British representatives: Sir Joseph Causton & Sons, Ltd., 8, Portugal Street, Lincoln's Inn, W.C.2)

Megalon. No. 476,276. Class 50. Insulating substances (electrical).—Thomas De La Rue & Co., Ltd., 110, Bunhill Row, E.C.1.

Turbax. No. 476,740. Class 50. Electrical insulating materials composed of textile fabrics and synthetic resin or other similar substances compressed into a homogeneous product and made into sheets, rods, tubes, and mouldings.—Dacier, Ltd., 15 and 16, Jewry Street, E.C.3.

New Work for Contractors.

Particulars of new works and building schemes for the use of electrical installation contractors in search of work and all interested in the sale of electrical and allied plant and other products.

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

ALSCOTT (Salop).—Sugar beet factory; Perry & Co., Ltd., contractors, Bow, London.

AUSTRALIA (Granville, N.S.W.).—Factory, for the Goodyear Tyre & Rubber Co. (£300,000).—*Reuter's Trade Service* (Sydney).

AYR.—Police Offices; the Chief Constable.

AYRSHIRE.—Additions to Davioshill Hospital; medical superintendent.

BARROW-IN-FURNESS.—Secondary school (£35,000) for the borough E.C.; director of education.

BIRMINGHAM.—Extensions, Cripples' Institution; Cripples' Union.

BOLTON.—Branch library, Moorfield estate; Borough Librarian. 50 houses, Kingscourt Avenue and other streets; Leigh Bros., Ltd.

BOURNEMOUTH.—Central store, Commercial Road; F. W. Woolworth & Co., Ltd. Warehouse, Malmsbury Park Road; William Dibben & Sons.

BRIGHTON.—Alterations, 157-162, Western Road; Boots (Chemists), Ltd.

BRIGG.—Schools (£13,000 to £15,000), for Lindsey E.C.; director of education, Lincoln.

BURY ST. EDMUNDS.—Schools (£24,000), for the borough E.C.; J. H. Wakefield, secretary. Housing scheme (18), Grove Park, for the T.C.; borough surveyor.

CHESTERFIELD.—Hotel (£9,000); T. S. Wilcockson, architect.

COTFORD (Taunton).—Nurses' quarters, Somerset and Bath Mental Hospital; A. W. Caley, clerk.

DONCASTER.—Additions to municipal offices at 53-54, Hall Gate; B. E. Ford, estates surveyor, 3, Priory Place.

DURHAM.—Additional housing scheme (122), for the T.C.; borough surveyor.

EASTBOURNE.—Additions, Pier Hotel, Cavendish Place; J. Bodle, Ltd. Additions, Claremont Hotel, Grand Parade; B. Stevens, architect. Alterations, Burlington Hotel, Grand Parade; P. D. Stoneham, architect.

FARNBOROUGH (Hants.).—Housing scheme (39), High Street, for the U.D.C.; J. E. Hargreaves, architect, Town Hall.

FIFESHIRE.—Extensions at Cupar Beet Sugar Factory (£85,000); the Manager. Secondary school at Dunfermline for Education Authority; Clerk, Education Authority, Kirkcaldy.

FRIMLEY (Surrey).—Housing scheme (50), for the U.D.C.; surveyor.

FROME.—Housing scheme (48), Keyford, for the U.D.C.; surveyor.

GLASGOW.—Hall, Alexandra Parade, for Martyrs' Christian Bond.

GRANTHAM.—Extensions to George Hotel, for Lord Dysart. Central schools, for Kesteven E.C.; C. B. Metcalfe, county architect, Sleaford.

GRAVESEND.—Electric light installation, Sanatorium; borough medical officer of health. Houses (114), for the T.C.; the Calway Construction Co., Ltd., builders, Marlow, Bucks.

GREENOCK.—Extension of the Royal Infirmary; secretary.

HALIFAX.—Modernising electric light system, Stannery Congregational Church; Rev. Keyworth Lloyd-Williams, pastor. Private hotel, café, and shop premises, near Shibden Park, Stump Cross; G. B. Oddy, architect, Ward's End Chambers.

HARROW.—Wesleyan Church, North Harrow (£5,175); trustees.

HASTINGS.—Garages and showrooms, The Green; Callow and Callow, architects.

HORNCHURCH (Essex).—Factory, Hornchurch Road, for the Art Metal Construction Co.

HOYLAKE (Birkenhead).—Cottage Hospital extensions (£10,618); William Fleming & Co., builders, Neston.

HULL.—Wesleyan Church, Newland (£16,250); trustees.

IRISH FREE STATE (Cork).—Development of Cork Harbour (£150,000); Harbour Board.

KIRKCALDY.—136 houses for Corporation (£60,920); burgh surveyor.

LANCASHIRE.—Bridge improvements (£80,000); county surveyor.

LEEDS.—Shopping centre, off Stainbeck Lane; Carr Manor Estate Co., Ltd.

LINCOLN.—Secondary schools (£25,000), and elementary school, Skellingthorpe Road (£8,500), for the city E.C.; director of education.

LONDON (East Ham, E.).—Tuberculosis dispensary, Barking Road; medical officer of health.

(Ilford, E.).—School, Barkingside (1,100 places), and extensions, Stevens Road Schools (800 places), for the borough E.C.; Adam Partington, clerk.

(Romford, E.).—Houses (46), Seymour Road, for Warriner and Herd.

(Highgate, N.).—Electrical installation, ten blocks of flats, Holly Lodge Estate, Makepeace Avenue; Central London Building Co.

(N.W.).—Restoration of Regent Square Presbyterian Church (£10,000); trustees.

(St. Pancras, N.W.).—5 blocks of tenements, Somers Town area; borough engineer.

(Lewisham, S.E.).—60 houses, Cranston Road Estate; Clout and Tysoe, Ltd.

(Woolwich, S.E.).—Schools, Eltham Housing Estate (£37,084), for the London E.C.

(Westminster, S.W.).—Reconstruction, Westminster Circus lavatories (£17,750); City engineer.

(Fulham, S.W.).—Buildings, Peterborough Road; H. N. Barnes, Ltd.

(Merton, S.W.).—Housing scheme, Whatley Estate (100), for the U.D.C.; G. Jerram, surveyor.

(Streatham, S.W.)—Housing estate development, Elmfield Estate; D. P. Hayworth.

(King's Cross, W.C.).—Extensions, Royal Free Hospital; Governors.

LLANTARNAM (Mon.).—280 houses; U.D.C. surveyor.

LOUTH.—Schools, Monk's Ryke Road (£19,000), for Lindsey E.C.; director of education, Lincoln.

LUTON.—Girls' schools, with electrical work, for Beds. E.C.; S. C. Parrott, architect, 9, George Street West.

MAIDENHEAD.—Houses (55), Boyn Hill, for the T.C.; William Creed & Co., builders.

MALVERN.—School of Art and Technical School, Albert Road; Worcestershire Education Committee.

MOFFAT.—Wing at Cottage Hospital; the medical superintendent.

NORTHFLEET.—Additional 52 houses, for the U.D.C.; surveyor.

OXFORD.—Extensions, Eagle Ironworks, Walton Well Road; W. Lucy & Co. Additions, works, Arthur Street, Oxford Electric Co., Ltd.

ROTHERHAM.—Church, Lord Street; Lieut.-Col. J. E. Knight, architect.

SHEFFIELD.—Wesleyan Church, West Street (£12,000); trustees.

SOUTHAMPTON.—Wesleyan Church, St. James Road (£19,700); trustees.

STOCKPORT.—Kinema, Wellington Road South, for Thomas Blower, 12, Lowfield Road.

SUTTON (Surrey).—Additional 34 houses, for the U.D.C.; surveyor.

WELLINGTON (Salop).—Housing scheme (30), Orleton Lane site, for the U.D.C.; William Walker, surveyor, Walker Street.

WEST MELTON (Yorks).—Houses (108); Frederick Bate, builder, Doncaster.

WEYMOUTH.—Additions Nurses' Home, Weymouth Hospital, Melcombe Avenue; Crickmay & Sons.

WORCESTERSHIRE.—Smallpox Hospital; medical officer of Health.

YORK.—Housing scheme (74), Tang Hall Estate, for the T.C.; F. W. Spurr, city engineer.